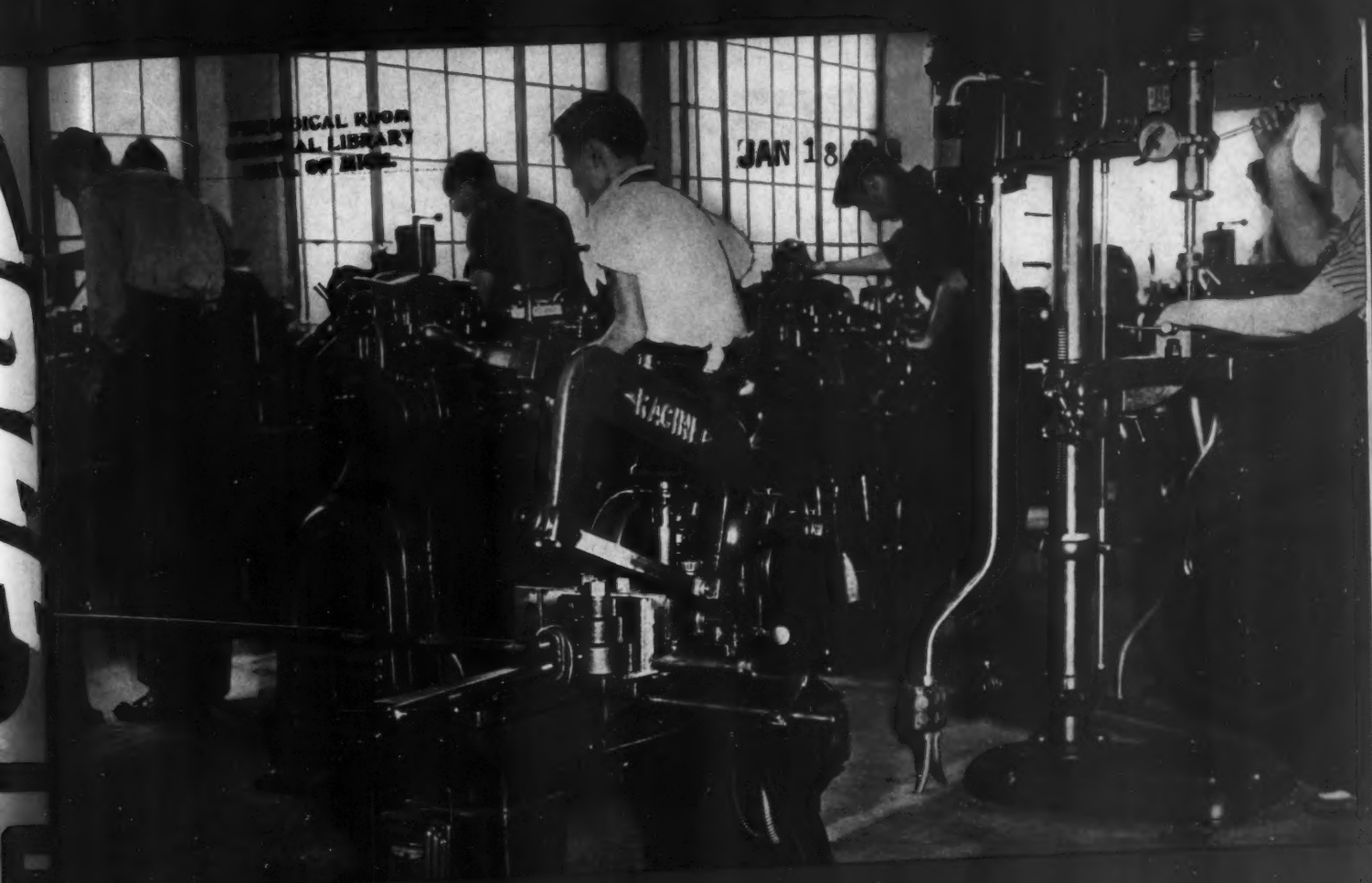
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# Industrial Arts and VOCATIONAL EDUCATION

THE SHOP TEACHERS' PROFESSIONAL MAGAZINE

FEBRUARY, 1942

VOLUME 31, NO. 2

# They're busy files these days!

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# INDUSTRIAL ARTS *and* VOCATIONAL EDUCATION

VOL. 31 FEBRUARY, 1942 Number 2

## THIS ISSUE

This number of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION contains a number of very helpful articles. For the teacher who is still looking toward gaining advance credits, the articles by Raymond Phipps and Alfred Allen are to be recommended. Vocational teachers, especially those engaged in training workers for the wartime industries, may do well to read what Philadelphia has accomplished during the years 1940 and 1941. They may also find help in Raymond Coltharp's and Elworth Black's articles. Those engaged in the teaching of welding may find helpful suggestions in the article by Stan L. Fox.

All teachers of industrial arts and vocational education should read the article by Raymond J. Coltharp, the one by Roy R. Van Duzee, and the one by Hyman Goldstein. These last three articles have great meaning in any branch of school shopwork.

The teachers of architectural drawing will be interested in the article by George A. Jester, and the teachers of mechanical drawing will find helpful material in the two pages of details by Frank E. Anthony, and both types of drawing teachers may be interested in Will G. Rodeman's article.

Teachers of printing will want to read the articles by J. Orville Wood, R. Randolph Karch, and Walter A. Shuman.

R. S. Lindenmeyer has contributed an article for the auto-mechanics shop and Homer C. Rose gives some excellent hints on finishing for the metalworking class.

The boys in the general shops, woodworking clubs, and boy scout troops will feel very kindly toward R. H. Jenkins and W. Ben. Hunt for their contributions this month.

Credit also is due to Tilden Collar for his fine informative article on television, and many industrial-arts teachers will find excellent use for Dean M. Schweickhard's "Drudgery and Dreams," and for Conrad Johnson's suggestive article on related information.

## THIS MONTH'S COVER

The picture shown on the cover depicts a machine-shop defense class at the West Allis School of Vocational and Adult Education, West Allis, Wis.

Roy R. Van Duzee is the director of this school.

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Short Talks on Wood

BLACK WILLOW (*Salix nigra*)

Considered a hardwood, yet is exceedingly light and soft textured. Strong for its weight. Easily worked. Glues very well. Pale reddish-brown in color.

Used in considerable quantities by furniture plants for glued-up core stock, table tops and veneered pieces. This industry often prefers to call the wood "Salix" because the name willow generally is connected with short-trunked, city-grown varieties instead of the commercial lumber tree. Also used to a great extent for boxes, crates and packing cases. An ideal wood for artificial limbs. Produces an excellent grade of charcoal.

A common tree throughout the eastern United States and westward to the base of the Rocky Mountains. Prefers the most soil along rivers and swamps, but will grow in fairly dry locations. One of the most rapidly growing trees in the country.

Is the largest of all native willows. The timber tree is tall and slender with a rounded head, open top and straight trunk. Frequently up to 80 feet tall with a trunk diameter of 3 feet. Extensively grown for windbreaks and to check soil erosion.

The bark is thick, dark brown and is deeply divided into broad, flat ridges which separate into plate-like scales. The leaves are simple, alternate, long, narrow and sharp-pointed, 3 to 5 inches long. Light green and shiny above, pale and dull below. Fruit is a catkin of small capsules containing many minute tufted seeds.

*To date, thirty-two brief articles similar to the one above and dealing with the more commonly used woods have appeared in these ads. As in the past, we continue to invite your suggestions as to the species of wood you would like featured in this series.*

YATES-AMERICAN

# INDUSTRIAL ARTS *and* VOCATIONAL EDUCATION

## A Graduate Student's Reactions to the Master's Thesis

RAYMOND WALKER PHIPPS*

It is noteworthy in numerous instances that after the genesis of certain circumstances there may come an almost overwhelming series of important findings. Then it would seem as though the hopes, ideas, and ideals have slumbered for ages to spring forth with a volcanic suddenness, and be followed by extensive and rapid developments. In this way was progress gendered by repeated trials, successes, inspirations, and the ability to put together the materials at hand into the plans for the future. Initial inventions and discoveries sometimes come after ages of casual and intense experimenting.

When the cave men yelled down deep canyons they marveled at the reverberations and echoes. Some one of the brethren found his guttural yells would travel a bit farther if he enlisted the help of the wind. Slowly, casually, and with but little concern this simple fact was recognized, and, ages later, after the discovery of a twisted and rolled elongation of metal called wire, it was found that by tapping a piece on one end the same taps were heard at the other. Then, in quick succession, came a series of instruments and devices that gave us the telegraph, telephone, radio, and now, the beginnings of television. From the meager beginnings ideas have grown to great significance. Many are the valuable and useful comforts that have come as by-products alone from the beginning of the early pondering over the mysteries of an echo.

Innumerable parallels can be drawn in science and industry. The savages' trail is replaced by rail, concrete, macadam, water lanes, and air lines. The oxcart has given way to rapid and efficient modern vehicles. There was a time when many inventions and findings were the results of fortunate accidents and incidents. Now we have research bureaus maintained by many industrial corporations that are continually testing and investigating in order that products may be improved and their uses extended. Archeologists are ever at work in order that we may thoroughly understand the past, and in turn appreciate the present, and build for the future. Again we must recognize that the method of progress is *research,* upon which hundreds of dollars, hours, weeks, months, and years are continuously expended. Yet, there are those who would belittle the value of research and research methods as tools or processes worthy of the notice of a prospective teacher.

Preparing the growing youngster for this highly fascinating and complex world demands the best in teaching abilities. The qualifications for entrance into, and continuance in, the teaching profession are being steadily increased. Particularly noteworthy have been the demands in recent years for better prepared elementary and secondary teachers of industrial arts and vocational-industrial education. This has not only placed pressure upon them, but it has challenged the quality of work in graduate schools of education. Since graduate work in industrial arts is still in its beginning stages, and the demand for advanced work quite pressing, some professors are finding themselves unprepared to offer to the sincere teacher really worth-while subject matter. As a consequence, it would seem that graduate schools and departments have hurriedly formulated courses in order to offer the master's degree, and then have blandly broadcast announcements of their newly built curriculums. These courses have often been but extensions or continuances of undergraduate work. The crying need for improvement and justification of efforts through the building up of adequate criteria, such as comes only through research, has been lost to sight.

Some schools, located in favorable climates, emphasize vocation and recreational facilities in the same breath that they announce their courses leading to advanced degrees. These announcements got up in patent-medicine style have their results! Each summer session sees a caravan of pedagogical vacationists setting forth to procure credit on the easy-effort installment plan. A further inducement is the alternative of waiving the thesis requirements providing the student takes a few (very few) hours of extra credit in a "formal course" — whatever that may mean. Some are waiving the master's thesis requirement, and making no mention of extra courses. Needed research necessarily goes begging at such institutions.

The patrons of these schools are usually teachers who, forced to secure a master's degree, seek places in which the process can be undergone as painlessly as possible. These schools lack professors who are willing to give the necessary time and study toward the building of research plans and guiding students in worthy studies. The sponsoring of research takes intelligence, inspiration, patience, and effort on the part of professors whose work is meaningful. Students who attend these schools where research is frowned upon have been known to say: "I need a master's degree to hold my job, and what difference does it make whether or not I do a research or write a thesis?"

What is the effect upon good schools when their students are attracted by the inducements of weaker colleges? Professors in our best universities, noting the enrollment in graduate summer sessions of the type referred to, are moved to consider seriously dropping the thesis requirement for the master's degree. Is professional and professorial laziness spreading?

Is the argument that many master's theses that have been written are worthless, a criterion for dropping them? Where true, may not part of the fault have been on the part of the professors serving as advisers? Does it matter that the schools and departments not requiring the thesis are attracting so many graduate students? One cannot help suspecting that many of them attend schools where they can acquire with ease those coveted but meaningless letters after their names.

Some continue to ask whether or not work toward a master's degree should consist of research efforts. The writer wonders what else is more justifiable, and, if the degree is

*State Supervisor of Industrial Arts and Director, Industrial Arts and Vocational Education, Teachers College of Connecticut, New Britain, Conn.

not awarded as a result of intensive research including a thesis, then why bother with graduate work at all? The time could be much more profitably spent in fishing or playing golf!

The writer knows an industrial-arts teacher who after several years of experience realized that he lacked much from the standpoint of a professional background. He had brought to his attention a graduate curriculum in industrial education that included research work for a master's degree, *and required a thesis.* This curriculum attracted other men seeking research opportunities and guidance in the conduct of their problems. A master's degree in industrial education in such a curriculum connotes the acquisition of some skill in problem solving and the development of some original work which is a contribution to the field. Having secured the first advanced degree the teacher was positive in his statements, as were others, that nothing could take the place of the satisfaction, personal and professional, that was gained; such satisfactions that he and others desired to continue in even deeper researches toward a higher degree.

Deeply appreciating the guidance he has had in his graduate work, the afore-mentioned teacher and many of his associates view with no little regret the tendency of some schools to waive research problems and thesis requirements for the first advanced degree in industrial education. There is reason for concern when it is known that certain so-called leaders in industrial-education departments of teachers' colleges and universities speak openly of abolishing the master's thesis requirements! Are they forgetting the number of men who are looking to them for inspiration, guidance, and help? Have their professional attitudes so weakened that they will listen to the shallow reverberations of that noisy minority of teachers who are seeking the master's degree along the avenue of little resistance? Or, are they so lacking in intelligence and energy that they have not the ability to prepare curriculums to meet challenges in their field?

If such a state of affairs continues many fine industrial-arts teachers are going to leave the field in disgust. Others who know and have visions of the opportunities for educational service are going to cease following some of our leaders in industrial education who seem to have "eased up" on the matter of professional perspiration. The elementary and secondary schoolmen who are awake to industrial changes, and who can listen intelligently and understand an adolescent's requirements, hopes, and demands, are already beginning to "shelve" certain spineless leaders when it comes to seeking guidance of a wholesome and vital quality.

We now stand upon the verge of the most fruitful growth the field of industrial arts and vocational-industrial education has ever seen. Our country and the general public, especially parents, are awakening to the true values of activity and laboratory courses. The wishes of our elementary and secondary school patrons and the needs of children behoove us to be more intensively and extensively progressive than ever. Capable and resourceful teachers are needed. A comprehensive acquaintance with the other fields taught, an enriched background in professional and industrial antecedents, a positive familiarity with skills, techniques, and processes, and the personality that will attract and hold confidence are a few of the more important requisites. Teachers, and particularly those in industrial arts, must show evidence of broad opportunities. They must be able to launch out and follow through to solutions of problems on their *own initiative* as they continually confront them in organization, content, and execution.

To keep abreast of increasing demands, and adequately serve the needs of a teacher and his pupils, the work offered in graduate industrial-arts and vocational-industrial education departments must hold to, and continually raise, their general standards of attainment. The colossal amount of work which needs to be done in industrial-education research, and the type of teachers the public is beginning to demand, point unerringly to the fact that the requirements in graduate work must not be lowered! Cannot the professors of industrial education in our leading universities and colleges *keep awake to their responsibilities, and stand up for what they believe and know to be significant on the graduate level?*

# Defense Training in Philadelphia During 1940 and 1941

JAMES K. SATCHELL*

The Big Four of Philadelphia's defense program are the vocational schools: Helen Fleisher, Jules E. Mastbaum, and its Annex, Edward Bok and Murrell Dobbins. Each of these public institutions had a working understanding with industrial employers long before the arrival of defense training problems. Their dates of erection in respective order are 1925, 1927, 1935, and 1936. The last two schools were aided by federal funds for labor and construction under the first Board of Education — Public Works Administration building program.

Besides the Big Four, ten high schools, nine junior high schools, an apprentice school and several manufacturing plants furnish classrooms for public school trainees. Both the effectiveness and scope of the program which started a year ago has been achieved through the united efforts of federal, state, and local administrators. Directing headquarters for defense training is located in the board of education's 12-story administration building.

The foresight of the school board is revealed by the fact that the nucleus for vocational expansion was established prior to any emergency. The average number of pupils belonging to the vocational schools during the year ended June, 1940, was 3164 boys and 3539 girls. Regular graduates find defense jobs because they have had three years of thorough preparation.

The following divisions of defense training are established in Philadelphia: (1) Supplementary instruction designed to sharpen the skill of persons already employed in national defense industries. (2) Pre-employment training for persons seeking jobs in national defense industries (state employment services furnish these trainees). Defense courses are also provided for youth employed by the National Youth Administration, and their ages run between 17 and 25. The following figures were released by the Division of Vocational Education during the summer of 1941:

**Enrollment in Defense Classes**

| | |
|---|---|
| Pre-employment trainees, WPA and State Employment Services | 2524 |
| NYA enrollees | 2092 |
| Supplementary trainees (evening and Saturday classes, employee upgrading) | 5151 |
| Total | 9767 |

**Classes in Operation**

| | |
|---|---|
| Training defense workers | 391 |
| Training NYA enrollees | 103 |
| Total | 494 |

**Individual Teachers**

| | |
|---|---|
| For defense workers | 420 |
| For NYA enrollees | 123 |
| Total | 543 |

*Office of the Secretary, Board of Education, Philadelphia, Pa.

**Pre-employment work on the model of contours and cross section of a ship. Jules E. Mastbaum Vocational School Annex, Philadelphia, Pa.**

Naturally, new defense courses are constantly appearing when there is a definite need for them. In order to fulfill these current demands for special trainees the Philadelphia Advisory Council on Vocational Education was established in August, 1940. It came as a logical result of the Department of Instruction's conferences with representatives of employers' groups, organized labor, governmental agencies and private educational institutions.

The council's executive committee examines all reports on the progress of defense training every week; the entire membership meets monthly. Members of this committee include leading representatives from the Franklin Institute, Philadelphia Industrial Union Council, Central Labor Union, United Electrical Radio and Machine Workers of America, International Association of Machinists, the Electric Storage Battery Co., Philadelphia Chamber of Commerce, Philadelphia Metal Manufacturers' Association, Painters' District Council, Pennsylvania Employment Service, and Philadelphia Public Schools.

The School Director of Vocational Education submitted these facts to the Advisory Council in his recent statement of progress:

**Enrollment in Defense Classes — July, 1940, to September, 1941**

| | |
|---|---|
| Pre-employment trainees, WPA | 7,083 |
| Pre-employment trainees, State Employment Services | 10,724 |
| Supplementary trainees | 20,545 |
| NYA enrollees | 4,359 |
| Grand Total | 42,715 |

The foregoing figures represent the number of trainees recorded in forty-five established courses. This summer 125 females were attending classes for immediate employment in defense industries; larger attendance figures for women will be recorded from now on. The female trainee has her choice of learning both the rudiments and fine points of detailing and tracing, light manufacturing and industrial inspection. More than a thousand women took summer courses as NYA enrollees.

It is still difficult to determine just how many graduate trainees are holding defense jobs. During the first year of the program about 60 per cent secured employment in their selected training field. Concerning the placement of trainees, the vocational director in one of his earlier statements of progress presents an explanation of industrial preparation before employment.

"It is to be remembered that industry is not yet in full production, and consequently is not yet ready for the large numbers of routine or partially trained workers who will be needed at a later date. Short intensive pre-employment courses can provide only partially skilled persons; they cannot create highly skilled, all-round mechanics. They are setting up a reservoir of partially trained workers who are available to industry through the public employment services as the need for such persons increases.

"As has been shown earlier in this statement, the schools have a share in the development of the superior, all-round mechanic, through their full-time preparatory courses in the senior high and vocational schools, and through their trade-extension and supplementary classes for the upgrading of employed workers."

A demand for 50,000 skilled workers is expected by the end of this year, and nearly half of this number will probably be national defense trainees. According to the city's Labor Market Survey, the *average* earnings of the defense graduate runs between 55 and 75 cents per hour.

The Mastbaum Vocational School — Cramp Shipbuilding Co. relationship, an excellent example of cooperation between educators and trades employers, serves well as a conclusion to the complete picture. From now on, ships entering the Delaware to join our American Navy will invariably carry away some work of the mechanics who either acquired or sharpened their skill through public school training courses. Cooperating toward the success of marine construction in Kensington district are Mastbaum and Cramp's. Mastbaum Annex was leased by the board of education from Orinoka Mills and opened April 3 of this year. Its five spacious floors are equipped to meet the first, as well as the latter training requests that came from Cramp's even before the shipyard opened.

Today the Mastbaum principal and his assistants are proud that their school with its marine trades curriculum is one of the bases for the school system's naval projects. The Mastbaum Annex already holds the wide reputation of being the "finest of its kind in the East."

Clear-cut descriptions of subjects taught at both main school and annex may be found in a "Training Opportunities" booklet issued by the principal. Under the heading "mold lofting" the prospective trainee reads:

**Murrell Dobbins, newest of the big-town vocational schools (boys and girls)**

"This course will train for jobs in shipyard mold lofts. It will give practical work on a real mold-loft floor, large enough to lay out a coast-guard cutter full size. Reading of ship blueprints, understanding of terms in shipbuilding, and procedures in construction will be given so the trainee will understand the other phases of shipyard work. The layout of ship lines on the loft floor, and the manufacture of templates for flat and vertical keel, transverse frames and bulkheads, longitudinal frames and bulkheads, inner bottom and decks, and furnace plates, will form the major part of the training."

An applicant for marine electric arc welding may appreciate the following information:

"This training prepares for jobs in arc welding. It will include the various forms of welding: flat, vertical, and overhead, using both direct and alternating current. Trainees will be given practical work to prepare them to meet the various navy tests welders must pass. The trainee will weld many test pieces to gain the necessary skill in welding metal of various thicknesses and shapes. Reading of blueprints of welded assemblies and the understanding of the various symbols used on the drawings will be given."

Ships-trades courses are also listed as marine sheet metal, coppersmithing, marine electric construction, ship fitting, pipe fitting, and gas cutting. At the suggestion of Cramp's, a supplementary course in shipyard storeroom practice was recently organized.

This two evenings a week course prepares the storeroom and material handling personnel at Cramp's. Inventory control is explained along with the methods of determining maximum and minimum stocks of material. The Cramp management supplies instructional data and materials required.

**Detailing bulkhead construction in the mold loft of the Jules E. Mastbaum Vocational School Annex, Philadelphia, Pa.**

Increased preparation for naval employment has affected trainees in all sections of the city. New projects include naval stenography at the Bok, for enlisted men assigned as yeomen, or clerical assistants to officers on duty at the Navy Yard; ordnance inspection will be enlarged at the Bok and Dobbins.

At the request of the Philadelphia Navy Yard, defense training of apprentices and trainees employed in its industrial shops and aircraft factory is expanding. This apprentice school, now operated by the board of education, has formerly been conducted for 11 months a year. Full-year operation is scheduled and additional instructors will be added if the apprentice enrollment continues to increase.

# Evaluation of Industrial-Arts Textbooks

RAYMOND J. COLTHARP*

Current educational practices have indicated a general agreement as to the general aims of industrial arts. Desirable situations provide experiences with tools, machines, and materials, all under careful direction, which tend to give the pupil avocational knowledge and training. In the achievement of these objectives, the selection of suitable texts and reference materials appears to be of major importance. The use of textbooks and reference material is increasing, according to Bulletin No. 34, U. S. Office of Education publication:

"The time has now arrived when a library of good books is an essential part of the equipment of every progressive industrial-arts shop, and evidence of their frequent use is an indication of one factor in good teaching. To the extent that books are used to stimulate self-activity on the part of the pupils they become teaching aids."[1]

The question naturally arises as to what determines the desirability of a book. Obviously certain factors, such as readability, attractiveness, suitability, and general utility are present to a greater or lesser degree in all textbooks, but teachers in the field are faced with the problem of evaluating and selecting books with few or no definite standards. Yet life is conditioned by standards which govern our every move. Regarding the need for standards:

"We will find that we couldn't get along in our daily life without standards. Take money, for instance, with the standard of value the dollar. Every single advertised product is built up to a standard of quality of some kind or other; imagine a recipe for cake being made without using a standard measurement for quantity of ingredients. The common foot rule is another standard we all need in everyday life. Standards are not new, untried, impractical dreams — they are proven in many ways actually to be necessary and then have gained general acceptance throughout the nation."[2]

The evaluation of textbooks in many curriculum areas has been aided by score cards, question lists, and the like. Hall-Quest[3] lists standards for the selection of textbooks in history, arithmetic, geometry, mathematics, physics, reading, spelling, and language.

*Rolla, Mo.

[1] *Industrial Arts: Its Interpretation in American Schools* (U. S. Office of Education Bulletin, No. 34, 1937).

[2] Ken McKierman, "Why Argue About Standards?" *Inland Printer*, XCIX (April, 1937), 33.

[3] Alfred L. Hall-Quest, *The Textbook* (New York: The Macmillan Co., 1918), pp. 87–120.

Jensen[4] has set up score cards for the rating of textbooks in arithmetic, language, reading, history, spelling, music, geography, and physiology. Dalthorp[5] has compiled a number of questions to aid in the evaluation of textbooks, yet there appear to be no definite criteria to aid in the evaluation of textbooks in the field of industrial arts.

The problem of selecting suitable textbooks and reference material is rendered increasingly difficult by the large number of publications offered for sale. The following table is based upon a survey made of the books offered for sale by the advertisers in five of the popular industrial-arts magazines during 1938. These magazines were: INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, *Industrial Education*, *Popular Homecraft*, *Popular Mechanics*, and *Science and Mechanics*. No claim is made that the list is all inclusive, but it is believed to be fairly representative of the offerings of publishers.

**Date of Publication of Textbooks Offered for Sale During 1938**

| *Textbooks* | *Before 1919* | *1920 1924* | *1925 1929* | *1930 1934* | *1935 1938* | *Total* |
|---|---|---|---|---|---|---|
| Aircraft | 1 | 1 | 4 | 10 | 2 | 18 |
| Air conditioning | 0 | 0 | 0 | 0 | 4 | 4 |
| Archery | 0 | 0 | 0 | 1 | 2 | 3 |
| Auto mechanics | 1 | 6 | 5 | 8 | 9 | 29 |
| Bird houses | 0 | 2 | 2 | 0 | 1 | 5 |
| Boats | 1 | 1 | 1 | 1 | 3 | 7 |
| Bookbinding | 0 | 0 | 1 | 1 | 1 | 3 |
| Ceramics | 0 | 2 | 1 | 3 | 2 | 8 |
| Drawing | 7 | 10 | 22 | 21 | 23 | 83 |
| Electricity | 3 | 13 | 13 | 13 | 14 | 56 |
| Farm mechanics | 1 | 1 | 0 | 2 | 2 | 6 |
| General shop | 0 | 0 | 1 | 0 | 10 | 11 |
| Guidance | 0 | 1 | 2 | 3 | 10 | 16 |
| Home workshop | 0 | 1 | 1 | 2 | 9 | 13 |
| Leather | 1 | 0 | 1 | 1 | 4 | 7 |
| Metal | 3 | 5 | 11 | 8 | 16 | 43 |
| Printing | 1 | 4 | 6 | 3 | 2 | 16 |
| Professional | 1 | 2 | 5 | 6 | 2 | 16 |
| Toys | 0 | 3 | 1 | 4 | 5 | 13 |
| Upholstery | 1 | 0 | 1 | 0 | 1 | 3 |
| Weaving | 2 | 2 | 1 | 3 | 4 | 12 |
| Woodwork | 15 | 12 | 26 | 25 | 12 | 90 |
| Total | 38 | 66 | 105 | 115 | 138 | 462 |

This table shows conclusively that the general field covered by industrial-arts textbooks is quite broad, and at the same time reveals glaring needs for publications in certain areas. With the hope that certain recommendations might aid in the evaluation and selection of books, a study was made of the various factors which appear to be most common in desirable textbooks.

The physical construction of a textbook is one of the first items to be considered. Whipple[6] assigns a value of 33 per cent to the various elements classified under this item. The binding and cover of a textbook make a definite impression on the user. A cloth binding is obviously more serviceable than a paper one, and the length of service of a book is an item worthy of consideration. Books which are so bound as to open flat cause less eyestrain than those which will not lay flat. The various recently developed spiral metal bindings, as well as plastic staples and clamps, make possible such opening of the book. "Since the convex surface of a page may result in eyestrain, it is suggested that books be bound to open flat."[7] In addition, the color and general appearance of the book frequently have a definite effect on the user's desire to see what is within the book.

The title of a textbook adds to, or detracts from, the general impression of the book. A brief title, rather than a lengthy one, is recommended. Pupils of high school age are not so likely to be interested in a textbook whose title indicates a matter-of-fact treatment of one material and its uses as they are in one whose title promises something new, or a treatment different from the usual textbook treatment of facts. Progressive educators have long made use of the factor of interest, and this might well be considered an essential part of a good title.

The size of a book has much to do with its general utility and use, as well as the durability. A large, heavy textbook will not have the convenience of a smaller one of the standard 6 by 9-in. size, hence will probably be less used. On the other hand, a book smaller than this is likely to limit the size and vividness of the illustrations, and so is not recommended.

The majority of textbooks are printed upon white paper, with little or no gloss, and this practice is in keeping with the recommendations of this study. "Schoolbooks should be printed in black on white paper. Legibility depends upon the contrast between the ink and the paper. To avoid the glare of reflected light the paper should be without gloss."[8]

Wide margins rather than narrow ones are recommended as being more desirable, because of their tendency to reduce eyestrain. "The margins should be wide enough so that the eye on the backward movement does not swing off the paper."[9] This recommendation is a criticism of the large textbook with two parallel columns on one page. It is impossible to read one column in such a book without some straying of the eyes to the other, and this is conducive to eyestrain. For the same reason, long lines are also undesirable.

Investigations, based on actual experience, point to the desirability of 10-point type. Type larger or smaller than this has a tendency to increase eyestrain, hence is not recommended. "Three-point leading for ten-point type set in twenty-one picas represents the most favorable reading conditions."[10]

The publisher, his experience in the field, and his reputation, are items worthy of consideration. In the various commercial fields one finds manufacturers with a proved record of successful products, and the same is true of textbook publishers. With no intention of belittling the products of any publishers, it is recommended that publications from companies specializing in the field of industrial arts be chosen in preference to those of publishers with a wide variety of products, and with little or no experience in the field. In the purchase of tools for the shop, buyers are hesitant about selecting tools from a firm whose reputation is not well established, and textbook buyers might well follow this example.

The copyright date and the latest date of revision offer tangible evidence as to the up-to-dateness of the textbook. These dates show conclusively how much the book may be abreast of the most recent additions to the fields treated in the book. A book which was a pioneer in its field a few years ago may be as much out of date as a used car. A frequent revision of methods and subject matter is necessary, for:

"A regiment of researchers and experimenters in the psychological laboratories of universities here and abroad have tested and tabulated the ways the mind works; and their statistically indisputable conclusion settles that a large number of heretofore accepted ways of going at a lesson waste time and damage minds."[11]

The recency of publication can easily throw a definite light on the relation between the philosophy of the textbook and prevailing trends. Progressive educational procedures must change from time to time, and these changes need to be incorporated into textbooks if the maximum of progress is to be made available to the user of the textbook.

The reputation and experience of the author is another item to be carefully considered. Obviously a textbook written by one who is an accepted authority in his field will be more likely to be desirable than the textbook written by the novice, with a limited experience in the field. The author's experience as an author, as a craftsman, and in the teaching profession, can add to, or detract from, the general worth of the book.

The preface of the book offers a definite clue as to the author's purpose in the preparation of the manuscript. In the preface can be found the hopes and aims which motivated the writing of the book. The following prefaces illustrate types which are recommended as being desirable:

"The purpose of this book is to supply the need for organized material dealing with the tools and fundamental processes common to many metalworking activities, and with related matter pertaining to the production, characteristics, and manipulation of the common metals."[12]

"This book is the result of fifteen years of work and experimentation with instructional material in ceramics in the industrial-arts department. . . . It comprises instruction sheets on pottery, intended for junior or senior high school levels, which conform to modern educational principles, and are so systematized and simplified as to be suitable either in the classroom or for the self-instruction of the more mature who wish to become acquainted with this fascinating craft."[13]

"In developing the material for this book,

[4]Frank A. Jensen, *Current Procedure in Selecting Textbooks* (Philadelphia: F. B. Lippincott Co., 1931), p. 144.

[5]Charles J. Dalthorp, "The Adoption of School Textbooks," INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, XCVII (October, 1938), 52.

[6]Gertrude M. Whipple, "Procedures in the Selection of Texts," *Elementary School Journal*, XXXVI (September, 1936), 107–109.

[7]Hyman Sachs, "Textbook Research," *Publisher's Weekly*, CXXXIII (June 4, 1938), 2242.

[8]*Ibid.*, p. 2283.

[9]*Ibid.*, p. 2283.

[10]Harry L. Gage, "Research in Readability," *Linotype News*, XVI (March, 1938), 2.

[11]William McAndrew, "School Book Famine," *Saturday Review of Literature*, XV (March, 1937), 11A.

[12]Edward Berg and Bristol E. Wing, *Essentials of Metal-Working* (Peoria: The Manual Arts Press, 1934), p. 3.

it has been the aim of the author to give to children some fundamental training from which they may be benefited, and from which they may gain much enjoyment."[14]

"This book is written in the language of the junior high school boy, and the jobs have been selected because they have held his interest. Between the covers is contained the essential information for doing the jobs."[15]

Such prefaces give one a definite idea as to what he may expect from the textbook for they give the prospective user a bird's-eye view of the contents of the book.

A comprehensive table of contents is economical of the user's time, enabling one to quickly locate the desired information. Hence this item is recommended as being worthy of consideration in evaluating a text.

"Detailed tables of contents to run in the front of the book serve a useful purpose. When the chapter headings with the outstanding subheadings listed underneath are selected carefully they give a quick but comprehensive picture of the contents."[16]

One of the major considerations in selecting a textbook has to do with its suitability to the grade or group level on which it is to be used. In preparing a manuscript for junior high school pupils the same vocabulary and general phraseology should not be used as would be found in a text used in a college. It is of importance that the textbook be chosen by one who is familiar with the interests, activities, and needs of the particular group who will make use of the book. Thorndike's[17] Word List appears to be an authoritative source for information dealing with the common use, frequency of occurrence, and possible difficulty of the words used by adolescents.

Present-day educational methods appear to justify the selection of books which emphasize the psychological rather than the logical method of approach. The psychological method has been found to appeal to pupil interests, and the use of this interest as a motivating element makes easier the presentation of tools, materials, and tool processes through the logical approach. If the general method is one that appeals to pupil interest it will of necessity be largely self-explanatory, and this is recommended as being desirable.

"Material should be presented in problematic form; the fundamental principles and the fund of information furnished by the text should be given in direct connection with those principles or projects which illustrate concretely such principles and information; the material should be so presented as to encourage constructive and independent thinking, arouse curiosity, challenge investigation, and inspire sustained work."[18]

Communities and schools vary in their interests, needs, and requirements; hence the books selected for texts and for references should be those which will offer a definite contribution to the locality where the book is to be used. The rural high school community, with agriculture as the predominating industry, will obviously require different textbooks and related information from that needed in a high school found in a city of 50,000 people, with industrial interests.

"The arrangement of materials of instruction is an integral part of the process of adapting courses of study to local conditions. . . . Special consideration needs to be given to the problem of selection and use of local materials."[19]

The pupil's comprehension of the subject matter treated in the textbook is affected materially by the author's choice of long or short sentences.

"Educators are frequently criticized, and rightly so, for the use of long involved sentences. Long sentences often convey a rather indistinct meaning, and leave the reader, especially one of high school age, with a hazy idea of what he has read. In short, a good text should possess short sentences."[20]

In addition to short sentences, they should be so worded as to be easily understood. All statements should be concise and accurate, with faultless grammatical construction.

The importance of illustrations in reading material is not likely to be overemphasized. Hall-Quest says:

"One picture will mean more than many words. Charts, tables, and diagrams are indispensable, provided they are properly explained by the author. When properly constructed such illustrations are of inestimable value in providing clear and accurate perception."[21]

Regarding the specific contribution of illustrations to the utility of industrial-arts textbooks:

"Constructions and fundamental operations should be well illustrated. By examining a number of textbooks one may find that many of the drawings and photographs are intelligible only to those who are already familiar with the construction illustrated. A drawing should be so nearly perfect as to present clearly and accurately the facts of the construction or operation."[22]

Thus it appears that illustrations should be accurate in every detail; that the size of the illustrations should be such as to make them easily understood, self-explanatory, and interesting. In addition, the processes described and pictured should agree with current industrial practices.

Instead of a large number of heavy black headings, it is recommended that there be as few headings as possible, and that these headings serve as an introduction to new materials and experiences.

"The most annoying feature of dull typography is the plethora of boldface headings. If the authors wished to remind their pupils at five-minute intervals (by subdivisions) that they are not reading a story, but are face-to-face with the hard, cold facts of education, they have succeeded."[23]

The textbook which contains a large number of references is more likely to awaken pupil interest, and to have a broad utilitarian value than is the one with few or no references. It is recommended that cold, hard facts be supplemented by copious references to other sources of information. The use of related information can add much to shop or laboratory courses through acquainting the pupil with problems of industry, methods of processing raw products, optional jobs or projects, and occupational information.

"Much more interesting is the supplementary material which gives body, filler, meat, life, background, and interest to the three pages a day assignment; it is no wonder that high school pupils rebel at the task of reading textbooks with no supplementary material. Put yourself to the test by starting off what might otherwise be a pleasant evening by reading a current textbook. Note how quickly you are irritated by the incompleteness, by the encyclopaedic nature of the work."[24]

Not only is it desirable that abundant related material be suggested, but this material should be readily available, it should be drawn from other school areas, it should be related to industrial procedures, and it should challenge the pupil to greater activity.

The listing of optional jobs, procedures, projects, and experiences is recommended as being highly desirable. The psychological approach calls for the development of individual initiative, and this can be brought about if the text can serve as a: "guide to interesting side trips or to points of special interest along the way. Its guidance to reference materials and to cognate subjects means the enrichment of the pupil's grasp of the subject. . . . The textbook so used becomes not a dead paper education, but training for immediate as well as remote ends. . . . Unless the present is well understood and gladly utilized, the remote will vanish in the mists of vain dreams."[25]

The use of review questions in the body of the text is recommended because of the economy of time. The prevailing custom is to include the review questions at the end of the chapter. Thought-provoking questions might well be included in the preliminary treatment of the topic. Pretests of a general nature are frequently used in educational procedures; the same questions when used at the end of a course afford a fairly accurate idea as to the progress made by the pupil. It is also recommended that the review questions be so worded that the answers may be checked by the pupils themselves. Such questions are an incentive to pupil activity and effort, and at the same time are economical of the teacher's time.

[14]John W. Dougherty, *Pottery Made Easy* (Milwaukee: The Bruce Publishing Co., 1939), p. v.

[15]Ross C. Cramlet, *Junior Handicraft* (Wichita: The McCormick-Mathers Co., 1937), p. v.

[16]Earl L. Bedell and Ernest G. Gardner, *Household Mechanics — Industrial Arts For the General Shop* (Scranton: The International Textbook Co., 1937).

[16]McGraw-Hill Book Company, *Suggestions to the McGraw-Hill Authors* (New York: McGraw-Hill Book Co., 1929), p. 6.

[17]Edward L. Thorndike, *Teacher's Word Book* (New York: Teacher's College, Columbia University, 1932).

[18]Samuel J. Vaughn and Arthur B. Mays, *Content and Method of the Industrial Arts* (New York: The Century Co., 1924), pp. 138–140.

[19]Alfred L. Hall-Quest, *op. cit.*, p. 84.

[20]*Ibid.*, p. 84.

[21]Alfred L. Hall-Quest, *op. cit.*, p. 139.

[22]Vaughn and Mays, *op. cit.*, p. 139.

[23]Hyman Sachs, *op. cit.*, p. 1130.

[24]Harl R. Douglas, *Modern Methods in High School Teaching* (Boston: Houghton, Mifflin and Co., 1926), p. 13.

[25]Alfred L. Hall-Quest, *op. cit.*, p. 165.

A detailed index is recommended as being highly desirable in a textbook. By use of the index the pupil is enabled to quickly locate information for which he has a need; if he must thumb through an entire chapter, or leaf over a number of pages, he frequently neglects to secure the needed information. Publishers consider a good index an essential part of a textbook, and advise authors to include them in the manuscript. "A good index is necessary in all technical work. A good index is one which enables the reader or student to locate readily the subject or item which he seeks."[26] The same publishing company, in commenting on the equalities of a certain textbook, says, "The publisher and the author did not think well enough of this book to supply it with a suitable index. We feel, therefore, that it is hardly worthy of a review in our columns."[27] Wiley and Sons, in their recommendations to authors, say, "We consider the index an essential feature of a book, and recommend that the index be full and complete."[28]

In selecting textbooks the item of cost is worthy of consideration. In those localities where pupils are expected to furnish their own textbooks, the selection of lower-priced textbooks usually meets with the approval of the patrons of the school. For this reason, lower-priced textbooks, if equally valuable in other respects, are recommended in preference to more expensive ones. Local conditions should be considered by the one entrusted with the selection of textbooks.

The evaluation of a textbook in the light of the previous recommendations may be aided by the following questions, which are based on these recommendations.

BINDING:
1. Is the binding of cloth rather than paper?
2. Will the textbook open flat?

COVER:
1. Is the color of the cover bright rather than dull?
2. Will the appearance of the textbook appeal to pupils?

TITLE:
1. Is the title short, rather than long?
2. Does the title challenge the interest?
3. Is the title easily understood?

SIZE:
1. Is the textbook of a convenient size?
2. Is the textbook easily handled?

PAPER:
1. Is the paper white?
2. Is the paper without gloss?
3. Is there a distinct contrast between the ink and paper?

MARGINS:
1. Are the margins wide enough to facilitate reading?
2. Are the lines short?

SIZE OF TYPE:
1. Is the type 10-point in size?

PUBLISHER'S REPUTATION:
1. Is the publisher a specialist in the educational field?
2. Does the publisher have the reputation of keeping abreast of current trends?

RECENCY OF COPYRIGHT:
1. Is the textbook of recent date (3 to 5 years old)?
2. Is the textbook based on current scientific and industrial procedures?
3. Does the textbook emphasize the latest accepted educational procedures?

BACKGROUND OF AUTHOR:
1. Is the author a recognized authority?
2. Does the author have a reputation for keeping abreast of current trends?
3. Has the author a background of experience?
4. Is the author a scholar?
5. Is the author a success in his chosen field?

PREFACE:
1. Does the textbook contain a preface?
2. Does the author state his purpose in the preface?
3. Does the author state the specific use for which the textbook was prepared?

TABLE OF CONTENTS:
1. Does the textbook contain a comprehensive table of contents?
2. Does the table of contents give a detailed list of the topics discussed in the textbooks?

SUITABILITY FOR GRADE LEVEL:
1. Will the pupil be able to understand the vocabulary used in the text?
2. Does the subject matter correspond with pupil abilities on which the textbook is to be used?
3. Do the suggested experiences meet the pupil's needs?
4. Are the suggested experiences consistent with current procedures, yet easily understood?

METHOD:
1. Does the subject matter lead from the familiar to the unfamiliar?
2. Are the experiences related so as to have a definite significance?
3. Are the processes treated according to their relative importance?
4. Are the experiences treated so as to lead the pupil progressively from one to another?
5. Does the general method encourage pupil activity through an awakening of interest?
6. Is the pupil challenged to constructive activity?
7. Are the experiences lifelike?
8. Do the experiences take account of social reinforcements?
9. Is the pupil stimulated to form his own generalizations and conclusions?
10. Are socially acceptable personal traits encouraged?
11. Is the pupil encouraged to become increasingly socially minded?

SUITABILITY FOR LOCAL NEEDS:
1. Is the subject matter suitable for use in the community for which the textbook is being selected?
2. Will the activities recommended by the textbook meet with the approval of the community?
3. Is the textbook suited to the needs of the size of the classes in which it will be used?
4. Does the philosophy of the textbook harmonize with that of the administration?

SENTENCES:
1. Are the sentences short?
2. Are the sentences easily understood?
3. Are the statements accurate?
4. Are the statements concise?

ILLUSTRATIONS:
1. Are the illustrations accurate in every detail?
2. Are the illustrations so numerous as to aid in the pupil's understanding of all fundamental processes?
3. Are the illustrations large enough to be easily understood?
4. Do the illustrations present processes in agreement with current industrial practices?
5. Do the illustrations appeal to the interest of the pupil?
6. Are the illustrations self-explanatory?
7. Are the illustrations up-to-date?

HEADINGS:
1. Is the number of headings as few as is consistent?
2. Do the headings introduce new material?
3. Do the headings fit readily into the reading of the text?

RELATED MATERIALS:
1. Is the suggested related material available?
2. Is the related material drawn from other school areas?
3. Does the related matter correlate with educational practices?
4. Is abundant related material suggested?
5. Does the suggested material introduce the pupil to industrial methods?
6. Will the related material challenge the pupil to greater activity?
7. Will the related material contribute to a guidance program?
8. Are the references annotated?

OPTIONAL PROCEDURES:
1. Do the optional procedures stimulate the pupil's interest?
2. Is the pupil encouraged to make his own decisions?
3. Are the options flexible enough to allow for individual needs and interests?

REVIEWS:
1. Can the pupil evaluate his own progress by the use of the review questions?
2. Do the questions challenge the pupil's interest?
3. Is the grading or ranking of these questions so arranged as to enable pupils to compare their progress with each other?
4. Does the satisfactory answering of the tests or questions encourage pupil progress?

INDEX:
1. Is there an index?
2. Is the index easily understood?
3. Does the index enable the pupil to locate the material sought?
4. Is the index complete?

PRICE:
1. Is the textbook economical?

In order to facilitate the ranking of books on a strictly comparative basis, a score card, based on the preceding questions, has been devised. A value of 100 per cent has been arbitrarily selected as the highest possible score, with a maximum and minimum value for the several items. An item may be given any value between the maximum and minimum, if desirable. It is believed that the ranking of a book by several competent and unbiased judges will give it a composite score; by following this procedure with a number of books it should not be difficult to conclude which are most desirable.

### Score Card for Evaluating Industrial-Arts Textbooks

Textbook..... Author.....
Publisher.....Date of Publication.....
Grade Level....Size of Book.....Price....
Type of community in which book is to be used .....
Directions: The items in this score card have been selected as being essential in a textbook. The numbers in the parentheses represent maximum and minimum values. In the blank to the right of an item you are asked to

[26] McGraw-Hill Book Co., *op. cit.*, p. 7.
[27] *Ibid.*, p. 8.
[28] Wiley and Sons, *The Manuscript* (New York: John Wiley and Sons, 1934), p. 12.

place the value which you ascribe to that particular item.

I. Physical make-up of textbook
- *a*) Binding: cloth (4) paper (2) ——
- *b*) Cover: interesting (3) uninteresting (1) ..... ——
- *c*) Title:
  1. Short (2) long (1)..... ——
  2. Interesting (2) uninteresting (1) ..... ——
- *d*) Size: convenient (3) inconvenient (1)..... ——
- *e*) Paper:
  1. Color: white (2) tinted (0) ——
  2. Gloss: none (2) some (1) ——
- *f*) Margins: wide (3) narrow (1) ——
- *g*) Type: 10-point (3) other size (2) ..... ——

II. Publisher
- *a*) Experienced in field (3) inexperienced (1) ..... ——
- *b*) Copyright date (4 if revised or copyrighted during last 2 years, 1 less for each year previous. Minimum of 0).... ——

III. Author: authority (4) novice (1) ——

IV. Preface: author's purpose stated, yes (3) no (0)..... ——

V. Table of contents: detailed (4) general (1) ..... ——

VI. Content:
- *a*) Suited to grade level (5) unsuited (0) ..... ——
- *b*) Psychological (9) logical (2) ——
- *c*) Suited to local needs (6) unsuited (0)..... ——
- *d*) Sentences: short (3) long (1) ——
- *e*) Illustrations:
  1. Numerous (5) few (2)... ——
  2. Interesting (5) uninteresting (1) ..... ——
- *f*) Headings: few (3) many (1). ——
- *g*) Related information: much (3) little (1)..... ——
- *h*) Optional jobs and processes: yes (4) no (1)..... ——
- *i*) Questions: listed in unit (3) not listed (0)..... ——

VII. Index: complete (5) incomplete (2) ..... ——

VIII. Price: economical (4) expensive (1) ..... ——

Total..... ——

# Interstate Certification of Industrial-Arts Teachers

ALFRED T. ALLEN*

The subject of teacher certification is not new. Neither is it old, nor will it become old — old, in a sense that it will cease to be a topic worthy of further investigation, study, and consequent evolution. Our ever changing economic life will necessitate continuous thought and revision.

Let us consider some of the changes of recent years. Time was when young people of college age were rarely away from home for any length of time. Time was when teachers spent a lifetime teaching in and around one small area. Now, an inspection of the directory of almost any student body or an examination of the list of teaching personnel on file in a state school superintendent's office discloses that the proportion of out-of-state students and teachers is quite extensive. Today, young people are advancing themselves when and where they can and for various reasons that we shall not go into here. It is predictable that this migration will continue as a definite aspect of our social life, and as such it must be dealt with intelligently by those individuals and agencies, who, in the ordinary scheme of things, have to do with these people.

Each field of endeavor has its own modifying limitations and requirements. For teachers, state certification laws and regulations must be considered. There is a belief held by many people to the effect that teachers, once they have a certificate, are fitted to travel and work as such anywhere in the United States and its possessions. But this is not the case, as many readers have undoubtedly discovered. Once a teacher leaves his home state, where he may hold ample certification, he will find that the basis for permission to teach in another state is generally his preparation rather than previous certification.

The establishment of the first normal school offering professional preparation took place in 1839, and was closely followed by the beginnings of certification legislation. Each state set up requirements considered essential in the attainment and preparation of all teachers who were employed to give instruction within its boundaries. While both preparation and certification varied from state to state, still, great advances have been made, but nearly all of this progress has apparently been accomplished by the states individually — not collectively or cooperatively. It is the present existing variations, present in some degree from the first, in the extent and application of these certification requirements and preparation curriculums that should require attention if the education of our migratory students and teachers is to be made more effective.

Certifying officers and those in charge of evaluation and the planning of programs constantly have to cope with the problems growing out of this lack of unity. The writer, assisting in the formulation of a department of industrial-arts-teacher education at Louisiana State University, encountered many of these difficulties and undertook a study of the situation and the relationship it had to teachers and students in the industrial-arts-education field. All of the work was done on the campus of Oregon State College under the direction of Professor George B. Cox. Sources of information consisted of letters from state school superintendents, state certification codes and bulletins, and published institutional catalogs. The curriculums studied were those reported by state departments as meeting the requirements for certification of industrial-arts teachers in standard four-year high schools. Each state was checked against all others and during the process over 23,000 items were taken into account. A review of the literature on the topic revealed little of direct or indirect value and inasmuch as state requirements are constantly changing only the literature of immediate nature proved to be of particular consequence. This material was found in the form of unpublished theses written in various parts of the country. The tables which summarize the possibilities of interstate certification form a large part of the study and are far too voluminous to present in this limited space.

Although industrial-arts education as a special subject received little recognition prior to 1910, by 1920 the objectives had broadened to an extent where the work was quite generally accepted as a part of general public education. It was recognized as an excellent means of teaching certain subjects in a concrete rather than an abstract manner, thus conforming with the changed educational philosophy, and making a considerable contribution toward meeting the objectives of general education. However, many administrators found it increasingly difficult to adjust school programs to current economic circumstances unless the teaching of industrial arts could be combined with the teaching of other subjects. To meet the demands growing out of the broader objectives of industrial arts and to accommodate the need for a combination

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of subject matter, the industrial-arts teacher needed further preparation in the technique of teaching, a mastery of subject-matter beyond his own field of specialization, and an understanding of the objectives of general education. In short, definite professional industrial-arts certification qualifications and definite industrial-arts-teacher education curriculums necessarily had to be set up. These undertakings have made progress during recent years, but, as in the case of general education, separate states have dictated the character of development and consequently this special field suffers from the same lack of unity. For instance, a count of industrial-arts-certification specifications reveals that some states have as few as two while others range up to as high as 37.

Analysis of these indicates certain interesting conditions.

It was found that some states require preparation of a general nature for all subjects. Others set up definite certification specifications for each subject. The latter may be classified into two groups. The first qualifies candidates to teach only in the industrial-arts field and is very specific as to technical preparation and hour concentration for each subject taught. This group tends to lean heavily toward the technical side, placing little emphasis on academic preparation. The second group certifies candidates to teach industrial-arts education as a major subject together with one or more minor subjects. In this section, course essentials are less specific and tend more to *lump sum* hour specifications for both the major and minor fields. These schedules were found to predominate in academic subjects, specially foreign languages, English, and professional education. Nineteen state schedules required a lump sum of education hours without naming the particular education courses. Twenty-one specified educational psychology; 16 — special methods; 13 — secondary education; 11 — principals of teaching; and on down in diminishing number through the 19 different professional courses scheduled. Two states required a stipulated amount of graduate work for teachers of general-secondary-school subjects only, but not of industrial-arts-education teachers. Two others required from one to three terms of graduate work of all secondary school teachers. One required that all teachers employed within its boundaries have four hundred clock hours of practice teaching in its public schools, while two specified a definite number of hours of residence work to be completed in their state schools of higher learning.

It is not surprising that quite as much variation and lack of uniformity was found in a study of the second principal component — preparation, as indicated by the curriculums studied. In fact, such a lack of uniformity of hours and subjects was encountered as to make certification and curriculum comparisons extremely difficult. Questions were constantly arising as to whether required courses in education were the same in subject content, only differing in title; whether the social-studies-group hours in one case included *speech* and *history* as provided in another; whether the industrial-arts-major requirement included education and technical hours or merely technical; and whether the content of a given-hour-value course was equivalent to the same course offered for another-hour-value elsewhere. In some instances, detailed and time-consuming search of school catalogs was productive of answering information to these questions.

But these difficulties, while no less important and the cause of immeasurable confusion to students and certificating agencies, are what may be termed *surface dissimilarities*. It was found that underlying these were greater influences of far-reaching significance. These appeared to fall into the following four divisions:

*Federal Subsidy:* Financial assistance from the central government such as is found in Smith-Hughes Vocational programs. It was found that some industrial-arts education curriculums, so influenced, prescribe courses in animal husbandry, horticulture, agronomy, farm machinery, management, utilities and structures, and dairying. Other curriculums, also seemingly influenced by federal subsidy, require courses closely allied to trades and industries; namely, day industrial schools, part-time education, vocational-education practice, related subjects, and philosophy of vocational education.

*Parent Schools:* Instances where industrial-arts departments seem to have drawn upon other affiliated departments and other schools in the university or college. As much as six quarter hours of art appreciation, music appreciation, principles of art design, lettering, and pottery were noted in one state curriculum for industrial-arts education. Another required 19 hours of physics and chemistry, courses in metallurgy and mechanical engineering. The first infers close alignment with the art department and possibly elementary-industrial-arts-teacher education, while the second infers a school of engineering influence.

*Academic:* Instances wherein the older idea of liberal arts still predominates and foundation courses in foreign languages are required to the extent of 12 to 18 hours. Very often in these industrial-arts education is permitted as a major subject but no prescribed course is offered. Available courses are usually garnered from various other departments and schools and the result is often without rhyme or reason.

*Local:* An influence that enters into most industrial-arts programs to some degree, depending upon the intensity of industrial or commercial activities and their relationship to the economic life of the particular region. Three states especially recognize local needs; one with its courses in loom work and textiles, another with its furniture design, and a third with inclusion of automotive transport, pumps, and irrigation courses.

The list of differentiating factors would not be complete without mention of specialization emphasis. Some states limit preparation for teaching in one field only. Others equip candidates to teach industrial-arts education as a major and one or more other subjects as minors. In no instance were two schools found wherein the extent and details of the offerings for the preparation of industrial-arts teachers were the same, not even within a single state.

Thus, after analyzing the character of the two principal factors and learning much of the existing lack of uniformity between the state programs, it was found that numerous difficulties face the ever increasing group of migratory teachers and students, and those attempting to advise them. The aforementioned problems resolve themselves into such questions as: How ably may a teacher meet *academically influenced* certification requirements if prepared by a *federal-subsidy-influenced curriculum?* How well satisfy *parent-school-influenced* specifications with *academically influenced* preparation? How evaluate *special-industrial-arts-curriculum* training to meet certification requirements based upon *divided emphasis,* and vice versa, for in many instances, the special curriculum does not afford minor teaching preparation. On the other hand, the divided emphasis curriculum is often unable to offer sufficient technical preparation to meet the specialized certification requirements. Or perhaps it is a question of a partially prepared *parent-school-curriculum* student changing to a *federal-subsidy-influenced curriculum.* These are but a few of the troublesome situations arising from the lack of uniformity between the states.

Others of equal significance arise from a lack of close correlation between the industrial-arts-teacher preparation and the certification regulations within each state. States having weak preparation facilities and difficult certification specifications, will likely find themselves developing an inbred situation. This will come about because their certification regulations will discourage migration from other states and act as a barrier to protect their own inadequately prepared product from the healthy competition of more thoroughly equipped candidates. Thus, each succeeding group so prepared will enter a field which is steadily becoming weaker. On the other hand states that have strong industrial-arts-teacher education, but do not have certification requirements of corresponding strength, compel their graduates to compete with those from other states having weaker preparation.

An exacting check of the prescribed curriculum of each state against the certification requirements of every other state revealed some very surprising facts. Outstanding among these was the relatively low proportion of interstate-certification opportunities. The industrial-arts teachers of one third of the states giving the most qualifying preparation, could meet the certification requirements of but a few

over half of the other states. It is possible that many readers will believe directed registration a remedy in many instances. But it must be remembered that, because of widely differing certification requirements, directed registration is possible only when a student points his education toward a certain goal, as toward the fulfillment of specific certification requirements of a given state. How many prospective teachers know beforehand that they may be obliged to go elsewhere to get a job? How many people knew before the Wall Street crash or the midwestern drought that they had best prepare for such eventualities?

No — directed registration will not entirely remedy the situation; nor will remedial measures taken separately by each state, unless there is a definite correlation of objectives. The situation is one that requires nationwide consideration and cooperation.

First should come recognition by all concerned as to what constitutes sufficient correlation between certification regulations and preparation within a state, and then what should be the uniform base between the states for industrial-arts preparation and certification. Possibly many will disagree as to the need or advisability of setting up uniform standards for industrial-arts certification and preparation. In answer, the writer quotes the introductory statement of United States Department of the Interior, Bulletin No. 19, Accredited Higher Institutions:

> In spite of the growing criticism of the measurement of the work of the institutions of higher learning by a set of formal standards, organizations representing various fields of higher education are more and more devoting their attention to the standardization of education in their respective fields. Accrediting by formal requirements may be an evil, but it appears to be a necessary one.

It would seem that the time has arrived when industrial-arts-teacher curriculums should assume a more definite and more uniform pattern, derived primarily from a single influence — an optimal contribution to general education. With more than 50 per cent of the states having raised their certification requirements for industrial-arts teachers since 1932; with industrial-arts preparation advancing in quality and quantity in a corresponding degree, now seems the opportune time for a movement to direct this training, that it may not be misdirected, thus adding to the confusion which already exists. Is it too ridiculous to presume that a teacher in a western state, for example, should have the same preparation in basic education courses as one in an eastern state, and vice versa? Or that education courses have the same titles, content, and credit hour values? Is it unwise to believe that the same basic certification requirements might be outlined for all sections of the United States? Surely it is possible to arrive at a balance of preparation and certification whereby the school patrons, the students, the teachers and administrators in the field, and the certifying agencies in all sections of our country will be served to the best interests of all. But this climax must be brought about by the concerted effort of all the states. Working together and evaluating and exchanging ideas, they can develop a thoroughly adequate well-rounded and effective basic program of industrial-arts-teacher preparation and certification; realize a *healthy exchange of teachers among the states;* and increase the growing regard for, and prestige of, this phase of public education.

# Safety in the School Shops

ROY R. VAN DUZEE*

*(Continued from page 385 of the November, 1941, issue)*

### Mortiser Safety Instructions

**Mr. Byerly, Mr. Jackson. Mr. Schoenike, Mr. Zarling**

1. Be sure to clamp stock tightly in place before starting machine. If the clamp cannot be used, see that hold-downs are in position.
2. When changing chisels, place block under foot lever to make sure it cannot be pushed down.
3. Test chisels to see they are tight before starting the machine.
4. When using the mortiser as a boring machine, be sure the hold-downs as well as the clamps are in place.
5. Keep the floor about machine free from blocks and refuse.
6. *Observe general woodshop rules at all times.*

### Shaper Safety Rules

**Mr. Byerly, Mr. Jackson. Mr. Schoenike, Mr. Zarling**

1. Do not attempt to operate this machine until you have been instructed in its use.
2. Before setting up a job, be sure both switches are *off.*
3. When changing cutters be sure:
   *a*) That binding nut is tight.
   NOTE: Have setting checked at this point.
4. Always use a fence for straight work.
5. Have hold-down adjusted to bind the wood to the table.
6. Always keep hands outside the hold-down.
7. Keep parts of both hands in contact with the table.
8. Always have your setup inspected before starting the work.

### Sliding Cut-Off Saw Safety Rules

1. Place stock to be cut against the saw fence.
2. Support ends of boards that overhang 3 ft. or more.
3. Stand to left of line of cut.
4. Grip yoke of machine with right hand.
5. Keep arm slightly flexed while drawing saw into the work.
6. Upon pushing saw back when work is finished, tighten the locking screw beneath the arm to prevent accidental rolling off machine.
7. Cut off power by disconnecting the plug whenever it is necessary to change the saw or make any mechanical adjustment of the machine.
8. *Observe all general woodshop rules at all times.*

### Wood-Lathe Safety Instructions

**Mr. Byerly, Mr. Jackson. Mr. Schoenike, Mr. Zarling**

1. Before starting the lathe be sure that the stock is clamped securely between the centers.
2. When centering large pieces to be turned between centers, bore shallow holes in each end before placing in the lathe.
3. When large stock is to be turned between centers, reduce the stock to an octagon before placing in the lathe.
4. Before starting the lathe be sure that the tool rest is set to the proper height.
5. Turn the lathe by hand to be sure that stock does not strike the tool rest.
6. Have no loose sleeves or dangling neckties when operating a lathe.
7. Rough stock must be turned to a cylinder at the lowest speed of a machine.
8. Always use the tool as demonstrated when taking a roughing cut.
9. When turning faceplate work, shut off the power and allow the machine to coast to a stop. Sudden stopping of the lathe may cause the faceplate to run off the spindle.
10. *Observe general woodshop rules at all times.*

*Past Supervisor of Industrial Arts, now Director of Vocational and Adult Education, West Allis, Wis.

## Safety Instruction Sheet on the Band Saw

Mr. Byerly, Mr. Shoenike, Mr. Jackson, Mr. Zarling

The band saw shown in Figure 1 is a typical form with the principal parts named. In order to properly and safely operate the machine, one should be familiar with the following four main points:

1. Precautions before starting;
2. Abuses of the machine;
3. Principal parts and their purpose;
4. Dangers to the operator.

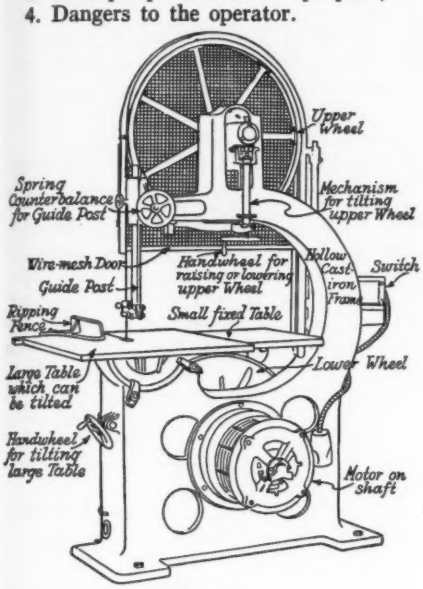


Fig. 1

1. *Precautions before starting. See that:*

*a*) The throat is not blocked.

*b*) The saw is in its guide.

*c*) The table is clear of scraps.

*d*) The standing room is clear.

*e*) The guide has been set so that it will just clear the stock. See Figure 1.

*f*) Several fingers of each hand are continually kept in contact with the table. See Figure 2.

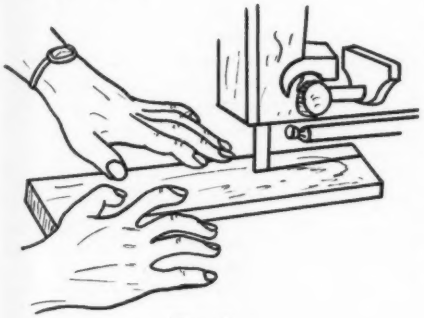

Fig. 2

2. *Abuses of the machine.* In order that the machine may not be abused, observe the following don'ts:

*a*) Don't start the cut until the saw has picked up speed.

*b*) Don't operate the saw with extra stock lying about on the table which may be knocked off into the saw.

*c*) Don't force the saw on curves too sharp for the width of the saw.

*d*) Don't force the saw with a cut that is too heavy, or a feed that is too fast.

*e*) Don't back out of long cuts while the saw is running.

*f*) Don't make adjustments while the saw is running.

*g*) Don't fail to remove all nails from the stock.

3. *Principal parts and purpose of each:* Saw guides upper and lower. See Figures 1 and 3. Mechanism for tilting; tension head or spring arrangement; throat; rollers; ripping fence; tilting table.

4. *Dangers to operator:*

*a*) Anything that will tend to slip saw from wheel. This includes backing out of long cuts, too much tension, stock on table that may get into saw at left.

*b*) Anything that will tend to break the saw. This includes forcing a dull saw, resawing boards held on edge but without side support to keep from rolling.

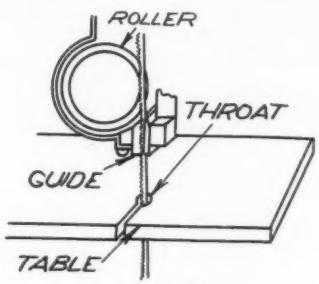


Fig. 3

*c*) Clearing scraps away from saw with fingers or brush. A stick should be used.

*d*) Sawing round or under cut pieces which are likely to roll under and throw hand into the saw.

*e*) Reaching around on the outside to control stock or pull stock through. The left hand should always be used, because if the saw breaks, it tends to fly "out" instead of "in."

*f*) Attempting to reach far back of saw, thus bringing face and head too close to the saw.

*g*) Attempting to saw pieces too small, thus putting fingers dangerously close to the saw. This includes feeding the last bit with the fingers, instead of using a push stick when the place is narrow.

*h*) Watching the operator from the right side of the table. If the saw breaks, he is in direct line of its whip away from the wheel.

### Safety Test on Band-Saw Practices

Name the lettered band-saw parts shown in Figures 4 and 5.

A..... B..... C.....
D..... E..... F.....
G..... H..... I.....
J.....

Fill in the correct missing word in the following statements in order to make the statements true.

I must observe the following precautions before starting a band saw:

*a*) See that the ..... is not blocked.

*b*) See that the ..... is in its guide.

*c*) See that the table is clear of .....

*d*) See that ..... room at saw is clear.

*e*) See that the guide has been set so that it will just clear the .....

The following abuses of a band saw are to be avoided:

*a*) A cut must not be started until the saw has picked up .....

*b*) Operating a saw with extra .....

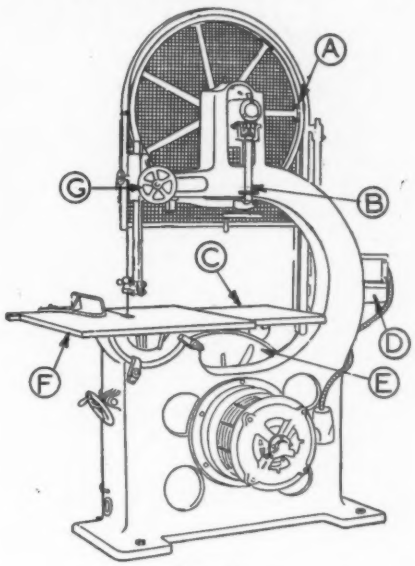


Fig. 4

on table which may be knocked off into the saw.

*c*) Forcing saw on curves too sharp for the ..... of saw.

*d*) Forcing saw with too heavy a ..... or too fast a .....

*e*) ..... out of long cuts while saw is in motion.

*Dangers to the operator:*

In order not to slip the saw from the

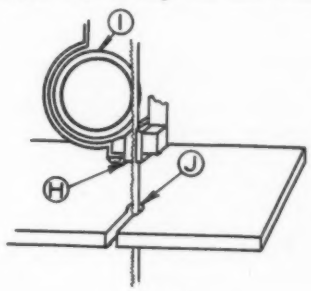


Fig. 5

wheels I must be careful not to:

*a*) Back out of .....

*b*) Put too much ..... on saw.

*c*) Keep extra ..... on tables.

In order to prevent a saw from breaking I must be careful not to:

*a*) Force a ..... saw.

*b*) Resaw boards held on edge without side .....

I should never clear scraps away from saw with .....

I must be careful to keep round pieces from ..... when sawing them.

The ..... hand should always be used when reaching around on the outside to control stock or pull stock through because:

If a saw breaks it tends to fly ..... instead of .....

In attempting to reach too far back of saw I must be careful not to bring the ..... and ..... too close to the .....

I must never attempt sawing pieces too .....

When a piece is narrow a ..... should be used in feeding the last bit.

# Selecting Student Learners for the Diversified-Occupations Program

ELWORTH BLACK*

The success of any nation, government, school, or company depends upon the quality of the personnel of that nation, government, school, or company, and the success of any diversified-occupations program depends, to a great extent, upon the proper selection and placement of the personnel of the class.

There was a time in the history of our country when the most promising of our students were chosen to be apprentices to the journeymen and masters of our skilled trades, but this idea is not so common today. Boys and girls in our high schools have had the idea of going to college stressed to them so much, that they have gotten the idea that anything less than college is a direct admission of their inferiority. We need somehow to change this notion that has been drilled into our school children for years.

Going to college is good for any boy or girl, but we as educators should recognize the fact that not all of our high school graduates can or want to go to college, and that other methods of training such as is made available by trade schools, diversified-occupations courses, commercial and arts courses, and vocational home-economics courses should be recognized and respected.

It is necessary for teachers and students to know that it requires more than an average amount of intelligence, and more than the average amount of training and preparation for a boy or girl to become successful in most of the skilled industrial and commercial pursuits.

Diversified occupations will not provide training for the masses, and it is not its purpose to attempt such a task. Diversified-occupations programs are set up to help those normal boys and girls, out of the heart of the student body, who sincerely want to learn some skilled occupation and plan to go to work as soon as they have finished high school. Diversified occupations is not a course planned to take care of disciplinary or problem children, and it is not planned for the fringe of the student body who cannot pass ordinary high school subjects with at least average grades. School officials who see in diversified occupations only a plan to take care of all the misfits and are reluctant to allow good students to participate in such a course should not ask for federal aid. It is not a course for these misfits, but it may take care of some of them.

Managers of industry and commercial pursuits need good candidates, because they need skilled men. These managers will be willing to cooperate with schools in the initiation of such a training program, but they will be unwilling to continue to cooperate if the student learners selected are not suitable for the job. Thus one of the major factors, if not the major factor, in the continued success of any diversified-occupations program is the quality and the suitability of the student selected to enter the program.

School achievement is important. The employers who are cooperating in the diversified-occupations program have a right to expect a student who has a good high school record. The mental and physical equipment of the student learner should match the requirements of the training that is to be given, and if the student learner is to progress in the training and advance in the occupation these things are essential.

Probably the most important factor to look for in the candidate is student interest. The student should want the training, and no student should ask to be taken into the diversified-occupations program unless that student is sincere in his desire to take advantage of the training opportunity that it offers. The student should be made to understand clearly that the course is primarily for those students who are not going to college, but it is not undesirable to point out that taking the course does not absolutely end his chances of going to college.

The co-ordinator should have a conference with each student learner's parents to learn from them the student's interests and sincerity in taking the training, and the co-ordinator should fully inform the parent and the applicant about the objectives of the course.

The following points should be considered in the selection of a student for a diversified-occupations program:

A. *Motive:* Sincere desire to learn a trade or occupation.

B. *Adaptability:*
   1. Physical fitness.
   2. Scholarship and I.Q.

C. *Attitude toward:*
   1. A particular job and work in general.
   2. Authority — superiors at school.
   3. Employer.
   4. The faculty and the school as a whole.
   5. Training in general.
   6. Parents.
   7. Church and general principles of morality.
   8. Success and how it is obtained.

D. *Age requirement:* 16 years minimum, 18 in some instances.

E. *Personal traits:*
   1. Honesty.
   2. Reliability.
   3. Punctuality.
   4. Cooperation.
   5. Personal appearance.
   6. Self-control.
   7. Confidence.
   8. Courtesy.
   9. Initiative.
   10. Accuracy.
   11. Industry.
   12. Interest.

F. *Aptitudes evidenced by:*
   1. Jobs previously held.
   2. Extracurricular activities.
   3. Hobbies.
   4. Other achievement outside of school.

The co-ordinator should keep all these things in mind at all times and start the process of student selection no later than the beginning of the second semester of the school year. This will give him plenty of time to select his student learners, contact parents and training agencies, and do a much better job of fitting the program to the needs of the community.

*Co-ordinator, Diversified Occupations, High School, Maryville, Tenn.

# Orderly Procedure in the School Printshop

J. ORVILLE WOOD*

With about two hundred boys coming into a school printing shop every day to spend less than an hour each in trying to learn some of the basic fundamentals of the typographic art, the teacher finds that he has to have more or less system in order to keep the shop intact and running smoothly.

The working tools in all other shops are comparatively few in number, and not easily carried away. In a printshop, however, there are a million pieces of type wherewith to produce the words that stimulate the imagination, create curiosity, and keep up the interest of boys. Nothing less than a case of type can be tagged or locked up from mischievous hands; and the amount of sorts that must be ordered each year to replace the various letters of nearly all kinds and sizes of type that are *lost,* is enormous.

On the first day of the semester that students of printing report for classwork at South Hills High School, the names of the members of each class are arranged alphabetically and each student is given a number. This number corresponds to a numbered chair where he will sit while the roll is being taken and when lectures or demonstrations are given. This seating arrangement saves time in taking the roll, as only vacant chairs are noted. Also, it aids the instructor in learning quickly the names of the new students.

In our shop there are 30 case stands. These places are occupied every period of the day by student compositors. Each case stand is labeled with a 2 by 2-in. slip on which is printed in 18-pt. type the names of the boys of the various periods who are assigned and required to work at the particular place. At the end of each period, the instructor can easily tell who is responsible for scattered type, odd leads or slugs, or anything else not in perfect order. No one can blame someone else, or use the alibi that the things out of place were left there by someone from the preceding class.

The body type that is used for exercises is all put up in 10-lb. fonts, and the spaces and quads in 2-lb. quantities. Duplicate proofs are made of the font of type, and the number of each of the various spaces and quads is noted. At the beginning of the semester a proof is given to the student and one is kept by the instructor. The student is held responsible for the amount of type entrusted to him, and he is expected to return the font at the end of the semester in the same condition as he received it.

All cases are numbered, and the various sizes of display type have correct labels. Each student in every class has a case of body type assigned to him and he alone works from that case. In printing I he works with 12-pt. type; printing II and III, 10-pt. type; printing IV and higher, with the smaller and larger sizes of display type. Each student is responsible for the clean condition of his own case. If he is a careless worker he must stop his regular work occasionally and straighten up his case. Of course, at the end of the semester he must leave his case in as good condition as he found it when he began. The last student using a job case is held responsible for its condition. The careful compositor always keeps his case and its surroundings in neat order at all times, and thus he is able to accomplish more work as well as better work.

Each student is assigned a numbered slide where he keeps his work on a galley when he is not in the shop. This is his place exclusively for keeping his composition of the various exercises. The work of the members of each class is grouped at different sections of the general storage place for such work and thus the galleys and work of one class are not disturbed by members of the other classes. In the roll book is noted the galley number of every student and quick check may be made of anyone's work.

There is a filing cabinet where all proofs are kept. Each boy has a folder with his name on the tab. The students' names are arranged alphabetically and each class grouped together. This facilitates easy accessibility for the instructor whenever necessary. The first, revised, and final proof of all jobs done by the students are filed in their folder. Since a date is always put on the proof when it is read or O.K.'d the progress of the student can be ascertained at any time. Should a student be transferred to another high school, and continue his work in printing, he needs merely to show his proofs of what he has done, and he can easily be placed so that he can continue the work where he left off.

A record of the work done by the student is kept in an 8 by 5-in. loose-leaf book. The pages are ruled and lines are numbered from one to 25 on some pages and 26 to 50 on other pages. The numbers correspond to the exercise job numbers. Columns are provided in which are written the dates of starting and finishing each job, the grade earned, and explanatory remarks if such seem necessary. Students may examine this book at any time to see what they have completed and what still remains to finish. When a pupil returns to take up the second, third, or fourth semester's work he starts in where he left off. If he returns after being out for a semester or two, it is an easy matter to determine where he should start again, for the sheets are filed in a post binder from the active book. The records of all the boys who have taken printing for the past 12 years are now on file.

Proof sheets, after they have been read and marked by the instructor, are not destroyed. The first proof taken of a job is read and marked by the student. This first proof is saved and accompanies the revised proof when taken to the instructor for reading. Thus it may be noted by the instructor how well the student has read the proof and how correctly he has used the proofreader's marks.

The job presses have been designated as No. 1, 2, and 3, according to size. Assignments are made to the students to operate the presses according to their ability, the nature of the work to be printed, and whether or not they are not behind in their typesetting. A notation is made in the roll book opposite the boy's name of the date and number of press operated. This makes it easy later to trace and place the blame on the right person for poor feeding or spoilage, and conversely, also easy to find out who deserves praise for a neat and accurate piece of presswork.

Whenever a student is assigned to a machine to produce some work, he is also put in charge of that machine, that is, he is responsible for its output and upkeep. No one else is permitted to operate it while he is at it; others must keep their hands off. This relieves others of any doubtful blame in case of accident or injury.

Students are not allowed to stand around a press when it is running. It is a strict rule of the shop, that pupils must keep away from presses when others are operating them. When pupils crowd around, they may interfere with the feeder and cause him to have an accident. At least he will not be able to concentrate and do as good a piece of work as he otherwise could. If an accident should happen, or the work is not done correctly, he is blamed for it. Then too, when a pupil starts to learn the feeding of a press, he is more or less nervous about doing the work right. Pupils who crowd around will only make matters worse.

The system just described reduces accidents, and is conducive to accurate press feeding, orderly case racks, clean floors, lack of confusion, and the students know at all times what they should do, where their jobs are, or where they should work. After the first week or two of a new semester, the shop seemingly runs itself.

*South Hills High School, Pittsburgh, Pa.

# Drudgery and Dreams

DEAN M. SCHWEICKHARD*

### Significant Signs

The month of February, containing as it does the birthdays of two great Americans whose names have become immortalized, is likely to turn our thoughts to them and other men whose works have lived after them with the query in our minds as to what enabled them to be men of outstanding accomplishment. We may be certain that their lasting renown came not from desiring to be great and widely known, but from the fervent and faithful pursuit of a cause conceived of as eminently worth while.

The difference between those who accomplish much and those who accomplish little lies partially perhaps in the aptitudes with which the different individuals are natively endowed, but probably more upon two other factors. The first of these is a vision of the direction and the goal one wishes to pursue, and the second is the willingness to put forth the effort necessary to move unfalteringly toward that goal. Many people have gone far enough to catch the first, and have fondled it affectionately. They have liked the name by which it is called — a dream, but failed to bring it into being because they have not liked the means involved. The way has seemed ugly to them and the name by which it is called is too frequently used only in its ugly sense — drudgery.

From the time of uncivilized man until now the dreams which occur during sleep have been subjects of interest, superstition, conjecture, and study. The belief most commonly attached to them has been that they were forecasters of events which were still to take place. Serious thought was given to relating dreams and great significance attached to their interpretation. In modern times it is said by those who have made a study of the matter that a dream which comes while sleeping is an expression of a hope or a fear deeply implanted within the nature of the individual. Whether the dream which is conceived and carried during waking hours ever becomes a reality, or exists in fancy only, it probably arises from the same sources and is of much the same nature as the dream which comes in sleep.

In either case, the things involved usually can be identified in one of four classifications: (1) things that have happened which have pleased or satisfied us and which we hope will happen again; (2) things that have happened which have displeased, pained, grieved, frightened, or disappointed us and which we hope will never happen again; (3) things that never have happened, at least to us, and which we hope never will happen; and (4) things that never have happened, but which we hope may happen. Whether our dreams while sleeping are centered upon things we fear or things we hope for depends upon our deep-seated state of mind, and native characteristics of which we may be totally or almost totally unaware. The things we dream of or aspire to during our waking hours are likewise indications of our strongest interests or the traits which are woven most inextricably into our beings.

When a slumber dream, particularly an unpleasant one, becomes too vivid it is called a nightmare. When a daydream goes too far from the realm of reality it turns into one of the forms of mental derangement. Since dreams, especially the conscious ones, are so closely bound to our lives and our possible destinies, it is well to examine them and derive what help we can from them. We need to be guided most by the ones which lead toward positive goals rather than negative ones; something desired rather than something shunned; something we strive to do instead of something we wish not to do. If conscious dreams are to be most worth while they must be a well-ordered combination between what we *hope* and believe may come to be; and a keen realization of what we *fear* may eventuate. Even this war, while gravely practical, calls forth in the heart of every American a vivid dream of ultimate victory. That would not be enough if we were not at the same time keenly alert to the incipient dangers which would frustrate our efforts and thwart the realization of that dream.

### In the Realm of Reality

To speak of a dream as anything possible of accomplishment may still seem visionary. That is exactly what it is and the vividness of the vision is what makes its final realization possible. A homely example may be brought to mind in the case of a flat tire on one's automobile. The flat tire is an actual situation which can be seen with the eyes, but the situation to be desired is a properly inflated tire which can be seen at the moment only in the mind's eye. Without a mental comprehension of the end to be sought a remedy could never be effected. No tire ever changed from a flat to an inflated state, however, by dreaming or hoping it would be so, but by the drudgery of actually performing the necessary operations one after another. The amount of that drudgery has been reduced by the introduction of demountable rims and interchangeable wheels, but some still exists and always will as long as tires have to be changed.

Every parent knows what it is to have high aspirations for the health, welfare, and success of his child. Particularly does he hope that his child may have these things in abundance if he himself has been deprived of them. Even if he possesses them in abundance he is willing to jeopardize them or sacrifice them in order that his child may possess them. He is willing to submit to days and years of drudgery in order that his dream may be fulfilled. How great a tragedy it is when the realization of such a dream is cut short by an untimely ending or what is still worse an ill-spent life.

The conscientious teacher likewise has real dreams of sound development and ultimate accomplishment for his pupils. The hours of preparation; the exercise of patience, firmness, and courage; and the adherence to high standards all require a regimen of self-imposed discipline which might be described as drudgery. It is saved from being entirely so, however, for when routine duties lead us toward the realization of a dream they do not seem like drudgery. It is only when the dream fades or disappears that these same duties weigh most heavily upon us.

The dreams of life are by no means all possessed by the parents and teachers. There is the vivid, brilliant, all-consuming dream of the young man or woman who catches the gleam of a goal in life which seems worth while above all things else. It may be in the world of finance, art, education, religion, science, engineering, business, public service, one of the professions, personal service, music, or literature. Wherever it may lie the pursuit of it almost invariably involves overcoming innumerable obstacles, enduring hardships, the expenditure of physical and mental energy, and numerous other details which would be enervating and distasteful if it were not for the envisioned goal.

### On to the Dawn

The essential difference between the shrunken soul and the great character between the bondsman and the free is not in that one fails to have dreams which the other has, but rather in the fruition of their dreams. Many dreams never materialize because of three common failings, namely: (1) impatience for immediate results without the faithful and consistent effort necessary toward the desired end; (2) procrastination, which is perhaps another form of shrinking from hard work; and (3) discouragement usually arising from unexpected obstacles, opposition, or temporary failure. Examples of this third cause may be noted in: the child who has been thwarted in his attempts; a young man rejected in love; a person suddenly bereaved; one encountering financial reverses; and one who has been betrayed by another in whom he has had implicit confidence.

Our individual dreams, and an understanding of the means by which they are made to live or are permitted to die, offer the only light toward the realization of our greater visions. The greatest dream we may have is of a world where men will be truly free; free to

(Continued on page 57)

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# INDUSTRIAL ARTS and VOCATIONAL EDUCATION

John J. Metz, Editor

## INDUSTRIAL ARTS AND WAR-TIME SERVICE

Teachers of students taking industrial arts in the secondary schools throughout our country, are, no doubt, looking anxiously into the future, wondering how they can carry on their work when materials of many kinds are being withdrawn from use, and when hand tools and power tools are more and more difficult to obtain in the open market.

To overcome these imminent difficulties will require immediate planning so that industrial-arts work may not be interrupted or hampered. In almost every home there are old pieces of furniture no longer in use. These may furnish materials for projects of many kinds. There are still wood packing boxes to be had, although they are rapidly giving way to paper cartons. The wood salvaged from the packing boxes lends itself to many uses. The projects made from it may lack the beauty of those made of new lumber, but the valuable lesson of adapting the things at hand to the needs of the moment should not be overlooked.

The paper cartons, too, may be utilized for making waste-paper baskets, flowerpot holders, and the like.

Many metal pieces of various kinds may also be salvaged from attics and basements. Old tools may be reforged, tempered, and given a new life of usefulness. Furniture that has seen better days may be strengthened and braced, or it may be rebuilt, refinished, and upholstered. The humble tin can may become popular again, although its life, as a source of available industrial-arts material, will be short lived, for even now it is classed as a valuable salvage item for war-service needs.

For communities where logs, saplings, and slabs are fairly easy to get, a wide field of adventure is open for students of industrial arts. There is rustic furniture that may be made for the home, for the home or school grounds, or for the community playgrounds and parks. Fences, arbors, bridges, road signs, and the like, also may be made.

In the industrial-arts work of the immediate future more attention may be given to carving, or even whittling may be reinstated. Then the service that the industrial-arts shop can give to the soldier should not be overlooked. Especially those communities near which training camps are established, can find many chances of cooperating with the military authorities in making the lives of our soldiers a little more enjoyable.

Then there is another thought that may bear investigation and study. Many of our industrial-arts shops, especially in the high schools, contain wood and metalworking machinery that could well be utilized for turning out, or at least doing the roughing out, of parts which could then be utilized by local factories engaged in manufacturing wartime products. This would mean repetitive work and might not mean as much educational effort as some teachers might like to instill into their work. These are abnormal times, however, and the solution of our problems may call for abnormal measures. At any rate, materials to work on, and probably needed tools and equipment, could be more readily obtained if this type of work could be inaugurated. And then, this work would not necessarily encroach on the actual industrial-arts instruction periods. If the machinery is there, why have it stand idle at any time during the day, the evening, or on Saturdays? Could not plans be laid to have students in relays turning out these needed materials in the evening and on Saturdays? Wartime service (the defense training of the past) classes are in session 24 hours per day; why should not every available power machine add its bit to the completion of the gigantic task of furnishing the necessary materials to our own army, and the armies of our allies, until victory has been achieved? The question of pay or no pay to the students, the paying of an overseer or teacher to supervise the work, workmen's compensation requirements, and the like, would have to be worked out by the proper authorities, of course. There is no doubt that this method of helping in this hour of national need would have a strong appeal to the students.

This particular method of having students participate in industrial work is about to be tried out at the Boys' Trade and Technical High School in Milwaukee, Wis. The plan that has been prepared by officials of the school and a local manufacturer who has large war contracts, permits the trade students to get their school training in the actual production of parts that require quite a bit of skill. This work would give the students the essential trade training, and being instructional in character, the students would receive no pay. The school, however, will receive the standard hourly wage ordinarily paid to subcontractors. This will compensate the school board for light, heat, and power, and some maintenance costs. The materials used by the school for this work will be provided by the manufacturer.

The city attorney's office has already passed upon the legal aspects of the question and it now remains for the school board to give permission to give this unique plan a trial.

## WAR NEWS — TRUTH AND GOSSIP

A prominent industrialist informed us that shortly after the bombing of Pearl Harbor, he had to make a hurried trip from his home town to Chicago. He had just packed his grip, when his son burst into the room with the question, "Where are you going, Dad?" Upon being told that his father was going to Chicago, the boy burst into tears and begged his father not to go because someone had just told him that gas bombs were being rained down on Chicago at that moment, and that everyone in Chicago was wearing a gas mask.

It took some time to straighten out that youngster and to impress upon him that in times such as these, stories were not to be believed unless they were corroborated by his parents or by his teachers. Furthermore, that troubles had to be met by fortitude rather than by fear, and that he should make up his mind to attend strictly to his studies, his play, and his home duties, and let the future take care of itself, as it would anyway.

The father showed good common sense in his exhortation to his youngster, but teachers should also help in building up proper attitudes in their students toward similar stories, many of which will be met during the coming strife.

Troubles and grief there will be aplenty; they will only be made more difficult if we anticipate them with fear. It is well to bear this in mind, and to help our students by giving them a sane outlook upon the troublesome future which lies before us.

# The "Courting" Period in Vocational Guidance

HYMAN GOLDSTEIN*

The general objective of vocational guidance, as defined by the National Vocational Guidance Association, is to "help the individual to choose, plan his preparation for, enter upon, and make progress in an occupation." Thus vocational guidance does not stop with the selection of a particular occupation. It continues throughout the entire preparation for it and throughout the entire working life of the individual. Similarly, vocational guidance does not and should not begin with the formalized attempts by the vocational guidance counselor entrusted with such duties. It should begin in the early classes in public school and continue right through.

According to D. M. Schweickhard in his comprehensive "Industrial Arts in Education," "The educational value of industrial arts in the early years of school life has long been recognized to the extent of acceptance as one of the essential and fundamental features of general education." The teacher of industrial arts is in a peculiarly fine position to render material assistance to the program of vocational guidance for the individual because guidance seems to be able to perform its best functions in the intermediate years of school life. This is particularly true where no provisions have been made for a vocational counselor to work hand in hand with the industrial-arts program. Consequently and fortunately, the industrial-arts teacher who is best equipped for the work, serves as a vocational guide. These duties are, naturally, in addition to the ones that he has as interpreter of modern industry to the student, as developer of a moderate amount of skill, as teacher of related technical knowledge, as inculcator of proper work habits, and as general all-round handy man who manages clubs, makes scenery, plans programs (and prints them), and acts as athletic coach when the occasion demands. The contribution that the industrial-arts teacher can make to a vitalized, comprehensive plan of guidance are enormous. How many do actually realize these opportunities?

It is in the industrial-arts class that the youth first gets to know some of the kinds of work that constitute industry on the outside. He may ultimately be "mated" to one of them for many years to come. It is the vocational "courting" period and whether success or failure will attend his efforts and ambitions may possibly be decided at this time. For the first time in his life the boy comes to grips with certain aspects of general mechanics, drawing, woodworking, general metalwork, and printing, to mention a few of the major activities of the average industrial-arts shop. All of these are or should be miniatures of the same trades found outside the school walls.

Since vocational guidance is by its very nature broad and inclusive, it overlaps and has connections with educational guidance, social guidance, sociocivic guidance, health guidance, ethical guidance, leisure guidance, and many of the other aspects of guidance activities. The responsibility of the teacher becomes indeed great.

There are many ways in which the industrial-arts teacher can practice vocational guidance. He should, of course, have the facilities and equipment to make all of his shop offerings part of a living, dynamic guidance. He should realize that complexity may be a prime characteristic of industry and business today, but that it is a complexity marked by a smooth and tremendous interlocking of many supposedly unrelated phenomena and activities. Posters, demonstrations, pamphlets, assigned readings and reports in books and journals, visits from leaders or workers in the occupational world, trips to outside industry, and numerous other ways are some of the ammunition that the teacher has with which to score direct hits in his assistance to the student. Although the teacher should be ever ready to help when necessary, it is preferable that the student be encouraged to attempt to secure the necessary and proper information for himself under the supervision of the teacher.

The status of the occupation in the hierarchy of occupations will be shown by the teacher in perspective as well as in its increasing or decreasing importance in the scheme of things. There should be a clear-cut picture in the boy's mind of the social aims of the occupation, and its importance to society in the way of service in the welfare of others. Its place in the hierarchy will also show whether or not it leads to something better, and, if so, what. The extent of the need of workers in this field will be covered in so far as the work is localized, national, or universal. This also gives a fair idea of possible geographical limitations on employment possibilities.

The knowledge of the size of the industry in terms of the capital invested and the labor employed helps to place the work in its proper position from a big-business point of view. This is, of course, related to the question of whether or not the industry is a growing one or one that is rapidly becoming obsolete, and also to the question of whether there is a surplus or shortage of labor. The question of labor turnover in the work is of vital importance, since it is concerned indirectly with the year round or seasonal nature of the work, as well as with conditions in the work that make it attractive and more or less permanent, or unattractive and more or less temporary.

The relation of the growth of the industry to the trend of the times will show how it has grown or changed. Along with this aspect can be outlined the opportunities inherent in the occupation, particularly with reference to individual initiative, leadership, originality, and research.

The above considerations have covered the general nature of the occupation in question, and its place with reference to the world's needs. The more detailed data and aspects of the occupation refer more directly to the qualifications and training needed for those who intend engaging in the work, the remuneration, advantages, disadvantages, physical and working conditions, social conditions, and ethical standards of the occupation.

It is reasonable to point out to the interested student certain physical requirements that are either strict necessities or desirable for workers in the occupation. These requirements may pertain to height, weight, age, health, strength, condition of the sense capacities of vision and hearing, and any other factors that will make for physical adjustment to the work. It is known that since occupations are so different, they naturally place different stresses on the men who make the best adjustments. The industrial-arts teacher should know the minimum physical standards required for entrance.

In so far as the psychological requirements of the trade are concerned, it is obvious that the teacher will, of necessity, have recourse to the psychologist, if one is provided, for ratings on general intelligence, special aptitudes, personality make-up, and mechanical or manipulative skills. Where the individual is evidently psychologically misfitted for the trade, much unhappiness and wasted time can be saved by early reconsideration by the student of any permanent or tentative occupational choice that he may have made.

The industrial-arts teacher should be able to inform his students of the extent of schooling required for the trade. He will point out just how much academic schooling is optimum and just how much is the required minimum. If technical education is necessary, he ought to have available

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the information relative to the number of years of such education for entrance and for satisfactory progress. Also whether or not this technical education requires full-time attendance; whether an apprenticeship may be substituted in lieu of part of the technical preparation; and whether attendance at the technical school is, of necessity, during the day; or whether the courses may be secured in evening school or through correspondence. His students will want to know the answers to these questions. Therefore, it is an excellent plan for the industrial-arts teacher to have available catalogs from the technical schools in the vicinity so that the student may peruse them at his leisure. In line with the technical training comes the question as to whether there are any opportunities for training on the job.

In addition to technical education the individual might possibly have to have experience in the trade before he is able to secure a job at the occupation. If experience is necessary the teacher ought to be able to inform the student just how much is usually considered minimum and what the best ways of securing this experience are. Some vocations require the worker to furnish his own tools and to wear special clothing. It is essential, therefore, that the industrial-arts teacher know which particular vocations demand this and to acquaint the student with these facts so that he may have some idea of the funds required for the initial outlay and for upkeep.

From the teacher the student will, of course, first get to know the real nature of the work and its main branches. The opportunities for further specialization will be outlined in detail and the ways and means of reaching these higher goals will be discussed. The types of tasks that constitute a typical day's work in industry will be reviewed and some attempt should be made to have the classwork program simulate in some measure this typical schedule.

The matter of remuneration is one about which there will always be many eager inquiries from youngsters trying to decide upon a lifework. They will want to know the usual starting salary, the average salary of those now engaged in the work, and the maximum pay to which one may aspire. Of course, they will be interested in knowing whether pay is on a piecework basis or on a definite salary schedule. The industrial-arts teacher will do well to discuss in rather simple language, if possible, such matters as retirement pensions, health insurance, accident compensation, and the like, which, though distant from the immediate scene before the youngster, will become realities that will face him sooner or later upon entrance into industry.

Next in importance to the immediate question of remuneration will be the matter of opportunities for promotion. The students may want to know just how much promotion depends upon further study and hard work, and how much is dependent upon chance or contacts. They will be interested in finding out the normal scheme of promotion, that is: where does the job lead to? Oftentimes, a definite picture of promotional steps will outweigh a seemingly inadequate starting salary.

It is incumbent upon the industrial-arts teacher to point out realistically the disadvantages, if any, of the occupation so that the youngster may go into it with his eyes wide open. The possibilities of dangers and accidents connected with the work must be discussed as also any industrial diseases that are usually attributed by health authorities to the occupation. Just as the future sand blaster should and must know of the danger and incidence of silicosis in that trade, so must the future painter be made aware of the dangers of lead poisoning and its incidence among painters. Ways and means of avoiding and preventing these hazards should be constantly pointed out. Safety precautions should be stressed throughout the entire class term.

Other disadvantages might conceivably be concerned with the lack of opportunity for mental, educational, and social growth or the restriction of it on the job. These are indeed grave questions and must be weighed carefully to make sure that they may balance accurately any occupational advantages that may seem glamorous to the mind of a youngster.

Often the industrial-arts teacher will be asked questions that are concerned with the nature of the physical and working conditions of the occupation in industry. These questions may have bearing as to whether the work is usually inside or outside; whether the temperature of the conditions under which the work is usually performed is high, low, or variable; whether the humidity is high or low; whether fumes, odor, or dust are part of the working environment; whether the occupation is accompanied by necessary noise that may be steady or vibrating; and whether natural or artificial light is usually used in the ordinary working situation. These are all matters which the prospective worker should know about because they affect his health, efficiency, and happiness.

Trips and excursions to industry should be made in order to give life and realism to the material of the textbook and to the classroom demonstrations and projects. Large technical and manufacturing plants may be visited with interest and profit. The visiting group should include mainly those interested in the particular vocation that is the subject of the visit. Direct questions should be asked of the foreman or conductor of the tour for the firm by the students concerning the activities of the occupation. Upon return to the classroom it is advisable for the teacher to present questions to the group of a practical and technical nature in a group conference. Only in this way will the greatest benefit of the visit be achieved.

When possible, interesting and effective speakers from industry who are well versed in the fundamentals of the working conditions and opportunities of the trade should be secured to address the group and to answer the many questions that individual students will be sure to have. The students will then be able to secure the worker's viewpoint that may be of great assistance in evaluating the trade as a possible lifework.

There is much interesting literature put out by various manufacturing and technical corporations on the different aspects of the trade in question. It is advisable to write for this literature and to make it available for individual consultation. A library containing these pamphlets, circulars, or books dealing with the trades taught in exploratory fashion by the industrial-arts teacher might conveniently be set up in some small room adjoining the shop. Posters that give graphic and pictorial representation to trade conditions should be hung on a bulletin board in the shop. Where the school budget will allow it, subscriptions should be secured for several trade magazines so that the students may keep abreast somewhat of the current advances and progress in the trade.

The industrial scene offers confusion and often discouragement to untrained eyes. The guidance efforts of the industrial-arts teacher will be worth while if they reaffirm the boy's interest or choice of his lifework but they may be of even greater aid if they succeed in pointing out to the boy the error of his original choice. It is better to discover errors of this kind at the start of a life career than after wasting precious years running toward the wrong goal. Vocational maladjustment is the basis of much vocational inefficiency, unrest, and unhappiness.

We must agree with Schweickhard when he states in the article already referred to "The industrial-arts department probably has greater possibilities than any other department of the school in preparing for intelligent vocational selection; and when the industrial-arts work is combined with a thorough study of occupations, a most excellent preparation is made for the guidance function of the school."

## DRUDGERY AND DREAMS

(Continued from page 54)

live, free to work, free to play, and free to worship. The war we are forced to fight against despotism is the drudgery which shall bring into being our dream of a world of free men. When that freedom has been attained, it will be because the vision has remained brilliant, and it will forever have to be preserved through a continuance of the diligent vigilance by means of which it shall have been won.

It is an evil thing for any man of education to forget that education should intensify patriotism, and that patriotism must not only be shown by striving to do good to the country from within, but by readiness to uphold its interests and honor, at any cost, when menaced from without.

— *Theodore Roosevelt*

# Applied Art in the Vocational School

WILL G. RODEMAN*

The modern trend in applied art has brought out the *streamline* effect so representative of this age of speed. Speed and efficiency in art have modified line, decoration, and color to its simplest form, and whether we like it or not, we should recognize that today we must produce beauty in the shortest and quickest way possible. Therefore, any good course in applied art should follow these principles.

The accompanying chart was primarily set up to help the applied-art teacher. It should also be of great value to anyone who wants to correlate the practical with art in our trade schools. The course as outlined features *design* and leads up from black and white to color in easy steps using all of the important mediums from pencil to brush, and many different kinds of paper, wood, or metal that may aid in getting interesting effects. Many different applications of useful things are suggested, so that in communities where metal is most used, more artistic metal jobs can be given, while in a place where woodwork is the basic industry, plenty of artistic woodworking projects can be inserted, and so on in textiles.

Instead of painting a beautiful picture on canvas, it can be conventionalized to harmonize with the product and then applied. Then, too, useful things themselves should be so designed as to bring out their most beautiful lines.

*Johnson Trade School, Scranton, Pa.

## Applied Art Aims

1. To learn the principles of design drawing and color, so that they may be applied to the useful arts in producing beautiful products.

2. To develop good taste and acquire a wider knowledge of the better things to wear, and better homes and interiors to live in.

3. To develop desirable personal traits and establish such values as neatness, accuracy, cleanliness, initiative, self-reliance, and orderly arrangement.

4. How to paint and finish useful things. This should encompass brush techniques, study of paints, and learning about standard colors and finishes for textiles, wood, and metal.

5. To make good posters. This will develop a knowledge of how to figure out and develop ideas, lettering, and how to conventionalize objects, and gives one experience in competitive situations.

6. To acquire knowledge and manipulations in the decorative field. The student learns how to develop and apply motifs to textiles, and wood and metal novelties.

**ANALYSIS of APPLIED ART in a VOCATIONAL SCHOOL**

THREE OR FOUR YEAR COURSE FOR BOYS AND GIRLS OF HIGH-SCHOOL AGE OR OVER

| LIST OF PROBLEMS AND JOBS | APPROXIMATE TIME HOURS | 1 TOOL MANIPULATIONS | 2 LAYOUT OF GUIDE LINES | 3 LAYOUT OF WORK | 4 SPACING | 5 BORDER FORMATION (CHECK) | 6 STYLE FORMATION (CHECK) | 7 FINISHED DRAWING | 8 FINISHED LETTERING | 9 INKING | 10 LINE ARRANGEMENT | 11 SPACE ARRANGEMENT | 12 CHART ARRANGEMENT | 13 COMBINATION | 14 FINISHED DESIGN | 15 CONVENTIONAL DESIGN | 16 MEMORY STUDY | 17 VALUE ARRANGEMENT | 18 COLOR SCHEME | 19 PAINTING | 20 MIXING PIGMENTS | 21 DECORATIONS | 22 WASH PROCESS | 23 TRACING | 24 IDEAS | 25 REFERENCE PLATES | 26 CLEAN UP | 27 STENCILING | 28 PRINTING | 29 SHADING | 30 CUT-OUTS | 31 CARVING | 32 WOOD FINISH | 33 METAL FINISH | 34 FREEHAND PERSPECTIVE | 35 VARNISHING | 36 WATER COLOR | 37 PAINTING | 38 RENDERING | 39 OILS & LACQUERS | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GENERAL OPERATIONS AND PRINCIPLES | | | | | | | | | | | | | | | | | | | | | | | | NOTE — X — DENOTES FIRST TIME USED | | | | | | | | | | | | | | | | |
| LETTERING CHART | 18 | X | X | X | X | X | X | X | X | X | | | | | | | | | | | | | | | | X | X | | | | | | | | | | | | | | | |
| PRINCIPLES of DESIGN HARMONY | 22 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | X | X | X | X | X | | | | | | | | | X | 26 | 27 | | | | | | | | | | | | | | | |
| PRINCIPLES of DESIGN RHYTHM | 22 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | | | | | | | | | 24 | 26 | 27 | | | | | | | | | | | | | | | |
| BRUSH DRAWING BLACK & WHITE | 9 | 1 | | | | | | | | | / | | | | 14 | | | X | X | | X | X | | | | 26 | | | | | | | | | | | | | | | |
| VALUE CHART | 14 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | 9 | 10 | | | | | | | | 18 | | 20 | 21 | | X | | 26 | 27 | | | | X | | | | | | | | | | |
| CREATIVE DESIGN BLACK & WHITE | 27 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | X | 17 | 18 | | 20 | 21 | X | | 24 | | 26 | 27 | | | | | | | | | | | | | | |
| POSTERS BLACK & WHITE | 27 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | 11 | 12 | 13 | 14 | 15 | 16 | | 18 | | 20 | 21 | | | 24 | X | 26 | 27 | | | | | | | | | | | | | | |
| COLOR CHART | 27 | 1 | | | | | | | | | | | | | | | | | | X | 20 | 21 | | 23 | | | 26 | 27 | | | | 31 | | | | | | | X | | | |
| WOOD NOVELTY DECORATION | 9 | 1 | | 3 | 4 | 5 | 6 | | 8 | | | | | | 14 | | 16 | | 18 | 19 | 20 | 21 | 22 | | 24 | 25 | 26 | 27 | | | | | | X | | | X | | | | X |
| SECTION PAPER DESIGN | 25 | 1 | | 3 | 4 | 5 | 6 | 7 | 8 | | | | 12 | 13 | 14 | | 16 | | 18 | 19 | | | | | | | 26 | 27 | | | | | | | | | | | | | | |
| BRUSH DRAWING COLOR | 20 | 1 | | | | | | | | | | | | | 14 | | | 17 | 18 | 19 | 20 | 21 | | | | | 26 | | | | X | | | | | | | | 37 | | | |
| CREATIVE DESIGN COLOR | 40 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | | 24 | 25 | 26 | 27 | | | | | | | | | | | | 37 | | | |
| MONOGRAMS | 15 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | | | 16 | | | | | | | | 24 | 25 | 26 | 27 | | | | | | | | | | | | | | |
| STENCILING | 25 | 1 | 2 | 3 | | | | | 8 | | | 11 | 12 | 13 | 14 | 15 | 16 | | | 19 | | 21 | 22 | | 24 | | 26 | 27 | X | X | | 31 | | | | | | | | | | 40 |
| INTERIOR DECORATION | 45 | 1 | 2 | 3 | | | | | 8 | 9 | 10 | | | | | | | | 18 | 19 | 20 | 21 | 22 | 23 | | 25 | 26 | 27 | | | 30 | | | | | X | | 37 | | X | |
| POSTERS SIMPLE COLOR | 40 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | 11 | 12 | 13 | 14 | 15 | 16 | | 18 | 19 | 20 | 21 | | | 24 | 25 | 26 | 27 | | | 30 | | | | | | | 37 | | | |
| WOOD OR METAL DECORATION | 20 | 1 | | 3 | | | | | 8 | | | | | | 14 | | 16 | | 18 | 19 | 20 | 21 | 22 | | 24 | 25 | 26 | 27 | | | | | X | 33 | X | | 36 | | X | | 40 |
| CHARCOAL DRAWING | 25 | 1 | | 3 | 4 | 5 | 6 | | 8 | | | | | | | | | | 18 | | | | | | | | 26 | 27 | | | 30 | | | | | 35 | | | | | |
| PEN & INK OR WASH | 30 | 1 | | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | | | | | 18 | | 20 | 21 | | 23 | | | 26 | 27 | | | 30 | | | | | | | | | 39 | |
| FREEHAND PERSPECTIVE | 30 | 1 | | 3 | | 5 | | | 8 | | | | | | 14 | | | | 18 | | | | | | | | 26 | 27 | | | 30 | | | | | 35 | | | | 39 | |
| TEXTILE PAINTING | 20 | 1 | | 3 | | 5 | | | 8 | | | 11 | 12 | 13 | | | 16 | | | 19 | 20 | 21 | 22 | | 24 | | 26 | 27 | 28 | 29 | | 31 | | | | | | | | | 40 |
| BLOCK PRINTING | 40 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | 11 | 12 | 13 | 14 | 15 | 16 | | 18 | 19 | | 21 | 22 | | 24 | 25 | 26 | 27 | | 29 | | 31 | 32 | | | | | | | | |
| MAT PAINTING | 20 | 1 | | 3 | | | | | 8 | | | 11 | 12 | 13 | 14 | | 16 | | 18 | 19 | 20 | 21 | 22 | | 24 | | 26 | 27 | | | | | | | | | | | | | 40 |
| ADVANCED POSTERS | 45 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | 11 | 12 | 13 | 14 | 15 | 16 | | 18 | 19 | 20 | 21 | 22 | | 24 | 25 | 26 | 27 | 28 | 29 | 30 | | | | | 35 | | 37 | | | |
| TAPESTRY PAINTING | 40 | 1 | | 3 | | 5 | | | 8 | | | 11 | 12 | 13 | 14 | 15 | 16 | | 18 | 19 | 20 | 21 | 22 | | 24 | 25 | 26 | 27 | | | 30 | | | | | 35 | | | | | 40 |
| WOODBLOCK RENDERING | 20 | 1 | | 3 | | 5 | 6 | | 8 | 9 | 10 | | 12 | 13 | | | | | 18 | | 20 | 21 | | 23 | | | 26 | 27 | | | | | | | | 35 | | 37 | | 39 | |
| TABLE FINISHES | 20 | 1 | | 3 | | | | | 8 | | | 11 | 12 | 13 | | | 16 | | 18 | 19 | 20 | 21 | 22 | | 24 | | 26 | 27 | | | | | 32 | 33 | 34 | | 36 | | 38 | | 40 |

Designed and drawn by Will G Rodeman

With this application of good design and color, he often learns how to complete the entire product in itself.

7. To correlate and cooperate with other departments. This may be done by making related information, plans, and the like, available to individuals or departments, thus aiding them in the solution of their designing and finishing problems which may arise with certain projects.

8. To gain a wider outlook on things beautiful. Giving the student an opportunity to study design and color in nature, and help him to choose more wisely when such choices must be made.

9. To advance creative thinking and work. Insisting on original design and its application, promotes the habit of working out individual ideas.

10. Guidance and the worthy use of leisure. Students working in the more advanced fields of art frequently develop special abilities which encourage them to take up certain work as a hobby.

# Problems and Projects

## PANELS FOR TEACHING RELATED INFORMATION

*Conrad Johnson,*
**Toms River, N. J.**

These panels are representative of the several visual aid arrangements which we have in our shop for the purpose of stimulating interest in the materials and information relative to industrial arts. Although many devices appeal to the intellectual interests, these were conceived with a view to appealing to the play tendencies of the pupils.

The first board which we constructed is shown in Figure 1. This panel has been in the shop for over five months, yet it is still popular, and received daily use.

The fundamental make-up of this and similar boards is not new, yet these particular designs and adaptations are original with us.

In each panel a terminal held in the left hand is placed on a bolt corresponding to a particular item; with the right hand the other terminal is placed on the bolt which represents the correct name of the article. Each time that a correct connection is made between an item and its proper designation, the arrangement in the window is actuated. An incorrect connection causes no response.

Figure 2 shows a panel which is essentially the same, yet this particular one has an even greater appeal because of the Walt Disney effect. Whenever a correct connection is made, Dopey nods his head and waves his pick. An appropriate backdrop depicting the entrance to the Seven Dwarfs' Diamond Mine adds to the effectiveness of this panel. Dopey, to be sure, gets a real workout many times daily. Figures 3 and 4 show how the Dopey panel is made.

The items on the panel in Figure 1 consist of some 25 different kinds of wood and several kinds of metal and materials. The backboard is of ¼-in. plywood, the sides of ½-in. boards. Ninety-six ¼ by ½-in. stove bolts and washers are required. A bell transformer was installed so as to reduce the house voltage down to 8 volts, which although it is sufficient to cause 3 small bulbs to flash, is so greatly reduced by the resistance of the wires that it is not perceptible to the touch. A piece of ⅛-in. pipe 2 in. long, soldered to the lead wires, makes a very satisfactory terminal.

Fig. 1. Making the correct choice

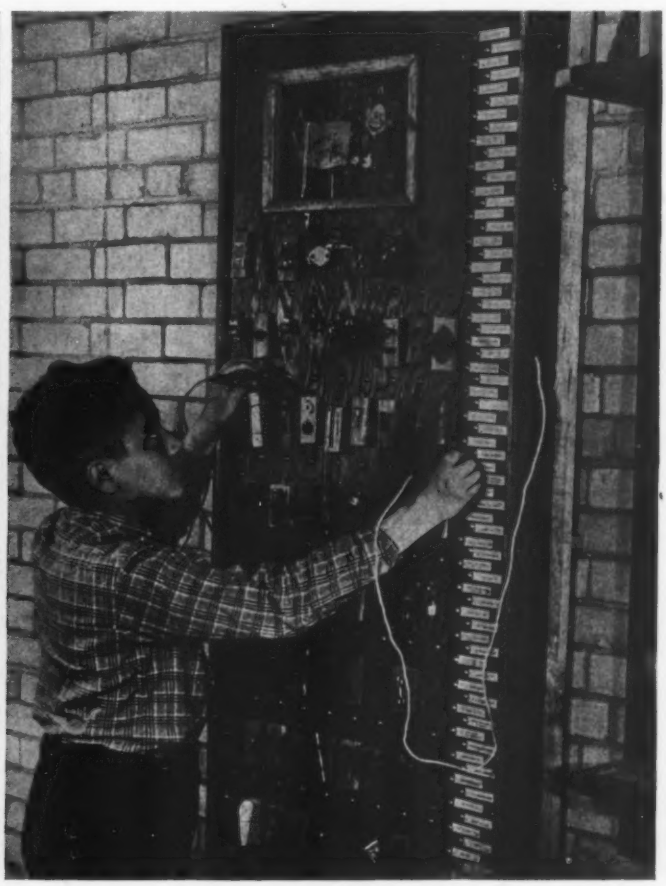


Fig. 2. Related information panel

The one shown in Figure 2 consists of a starter switch from a 1937 Ford which is actuated by several dry cells in series. The cells are necessary in this instance since the switch is a d.c. solenoid. The switch is held in place by two stove bolts. Dopey's head and arm are so arranged on pivots and connected by a simple link that he is actuated by the single short stroke of the solenoid.

In making these panels perhaps the easiest procedure is to first make provision for the window, and to lay out the spacing for the items, their terminals, bolts, bore holes and insert bolts, washers, and nuts. Next connect any "item" bolt to a "name" bolt with a short piece of insulated bell wire, and continue until all bolts are wired. A narrow shelf is installed to carry the lights or other device and the glass inserted. The name cards can then be tacked in place, put on in any order. The items can be correctly placed on the escutcheon pin hooks by starting at the top name and tracing the wire to the correct hook.

The items are wired to blocks and held on the hooks by small screw eyes. The hardware panel consists of 81 pieces of hardware. The solenoid can be obtained at any auto shop and the dry cells are readily obtainable.

These panels offer many possibilities for experimentation and teaching opportunities. As yet we have but used them incidentally to establish an acquaintance with the various materials shown, and for illustrating certain electrical principles. The sizes suggested are optional, of course, and may be determined by the nature and sizes of the material that is readily available.

We are very much pleased with the enthusiastic response given to these panels by the students, and we are convinced that they have been very much worth while.

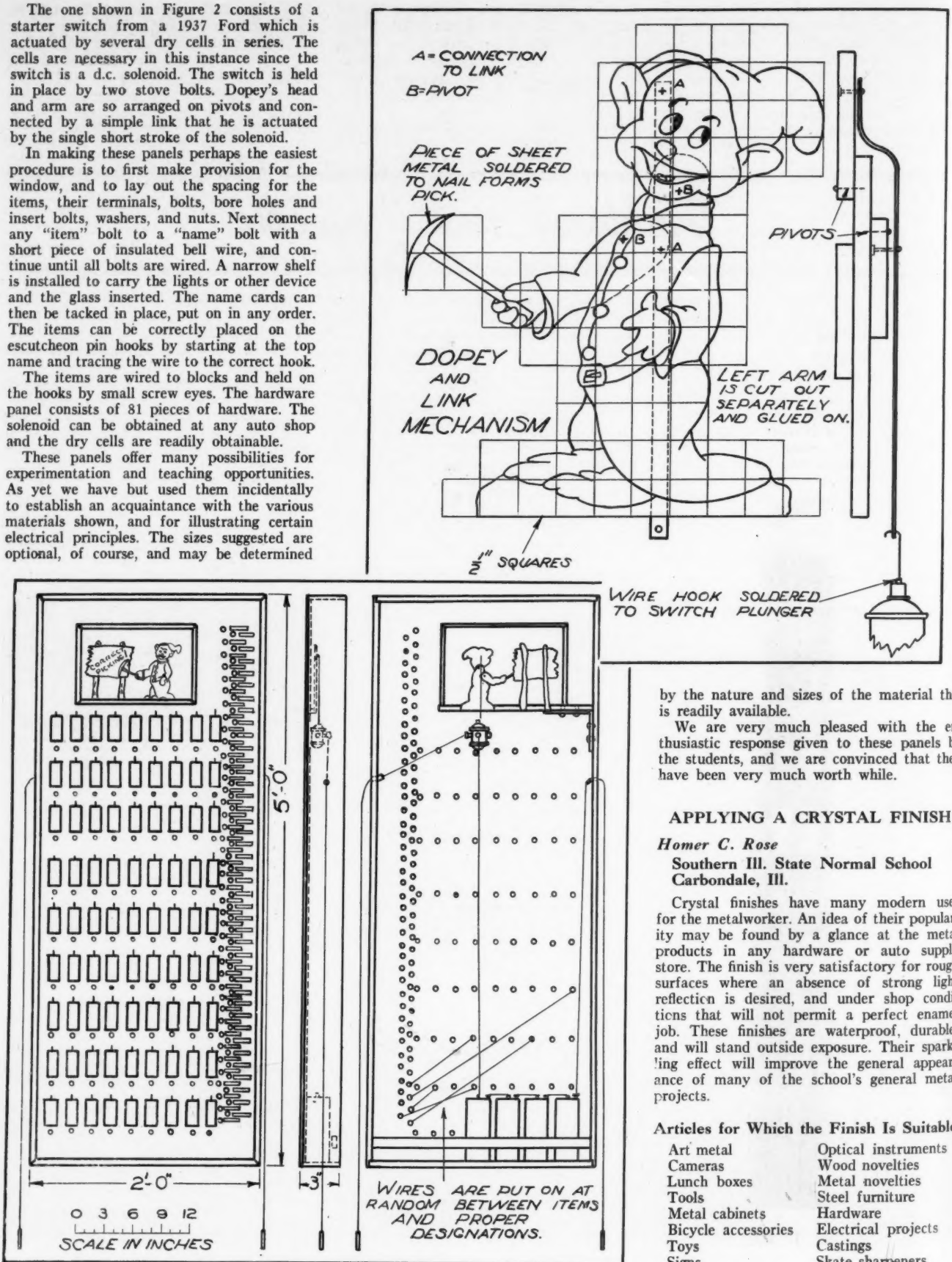

A = CONNECTION TO LINK
B = PIVOT
PIECE OF SHEET METAL SOLDERED TO NAIL FORMS PICK.
PIVOT-S
DOPEY AND LINK MECHANISM
LEFT ARM IS CUT OUT SEPARATELY AND GLUED ON.
½" SQUARES
WIRE HOOK SOLDERED TO SWITCH PLUNGER
5'-0"
2'-0"
3"
0 3 6 9 12
SCALE IN INCHES
WIRES ARE PUT ON AT RANDOM BETWEEN ITEMS AND PROPER DESIGNATIONS.

Fig. 3. Related information panel

## APPLYING A CRYSTAL FINISH

*Homer C. Rose*
**Southern Ill. State Normal School**
**Carbondale, Ill.**

Crystal finishes have many modern uses for the metalworker. An idea of their popularity may be found by a glance at the metal products in any hardware or auto supply store. The finish is very satisfactory for rough surfaces where an absence of strong light reflection is desired, and under shop conditions that will not permit a perfect enamel job. These finishes are waterproof, durable, and will stand outside exposure. Their sparkling effect will improve the general appearance of many of the school's general metal projects.

### Articles for Which the Finish Is Suitable

- Art metal
- Cameras
- Lunch boxes
- Tools
- Metal cabinets
- Bicycle accessories
- Toys
- Signs
- Camera tripods
- Optical instruments
- Wood novelties
- Metal novelties
- Steel furniture
- Hardware
- Electrical projects
- Castings
- Skate sharpeners

### Materials

Crystal finish (made in black, colors, and clear by Hilo Varnish Corp., 4260 Stewart Ave., Brooklyn, N. Y.), turpentine, clean rag, old baking oven or metal box.

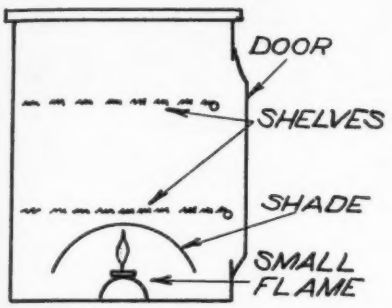



Fig. 1. Section through oven

### Procedure for Black or Galvanized Iron

1. Allow a small yellow gas flame to burn in the closed oven so as to heat it up to, but not over, 110 deg. F. This temperature may vary slightly, but best results are obtained if the temperature is not permitted to rise over 110 deg. F. All vents for the admission of air into the oven should be closed and the oven should be dark. If no gas supply is available, a large candle or alcohol lamp may be used. The flame should be shaded to keep the oven dark. See Figure 1.
2. The finish, as it comes from the can, should be applied rapidly with the brush or spray gun. Figure 2 shows a boy applying the finish with a brush. Direct sunlight should be avoided as it interferes with crystallization.
3. Place the painted articles in the oven so that freshly coated surfaces are at least 2 in. apart.
4. Close the door and leave the work at a temperature that is not over 110 deg. F. for 45 minutes. No fresh air should be admitted to mix with the gases from the flame until the crystallizing is completed.
5. After the crystals have formed, the colored finishes may be air dried or baked at 225 deg. F. for 2½ hours. Clear finish may be air dried or baked at 150 deg. for 4 hours. See Figure 3.

### Procedure for Colored Enamel Over Bright Metal

1. Apply undercoat or gloss enamel of the same color, or if the finish is to be baked at 150 deg. or higher, use Hilo No. 926 Rubber Baking Japan.
2. Allow this coat to dry thoroughly before crystallizing finish is applied. If the undercoat is not dry, the finish will not crystallize properly.
3. Continue procedure as for black iron.

### Modified Metallic Effects

Other effects may be obtained by using crystal enamel in the usual manner, and after the coating is dried, applying a coat of Bronzing liquid or other common metal finish.

Transfers and stripping may be used over finish when in color or under the clear crystal enamel.

A thin coat of crystal enamel will form small crystals. The heavier the coating, the larger the crystals.

The finish may be used on wood if a gloss enamel is used as an undercoat to seal the surface.

Figure 4 shows a photographic contact printer as it appears with a single coat of crystal enamel. This project was made by a 9-A general metalwork student.

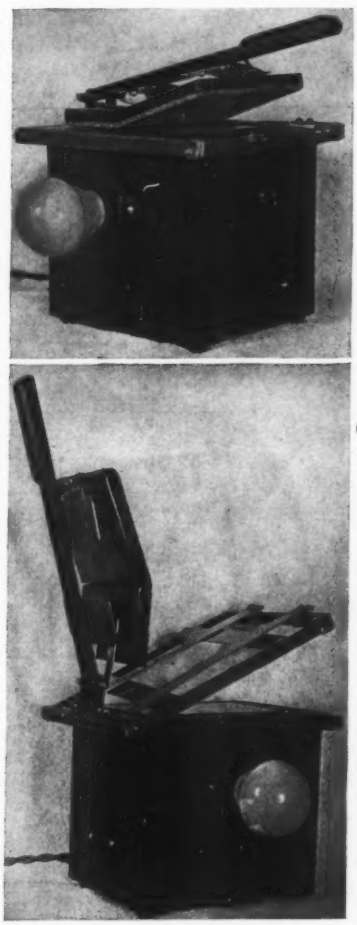


Fig. 4. The finished project

## WELDING SHOP BUILDS FLAGPOLE

*A. F. Davis*
**Cleveland, Ohio**

The accompanying illustrations show a flagpole built by students in the welding shop of Huntington Trade School, Huntington, W. Va., using the electric arc process with equipment supplied by the Lincoln Electric Co., Cleveland, Ohio.

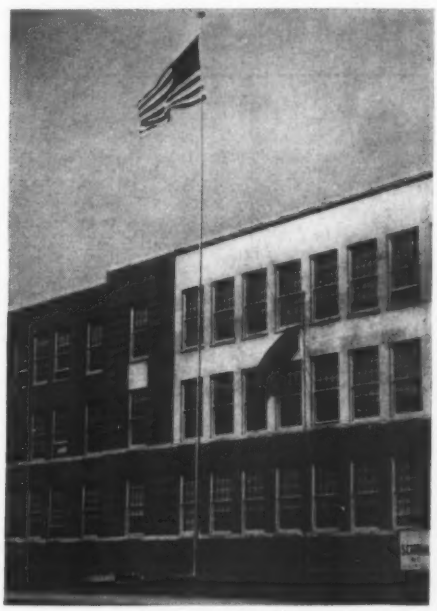


Fig. 1. 80-ft. welded flagpole

The flagpole shown in Figure 1 is made of black iron pipe with the exception of the bottom section which is of galvanized casing. The finished height of the pole is approximately 80 ft. The bottom section, see Figure 2, is of 2½ in. by 10-ft. black iron pipe. There are 7 sections of different lengths. Each one is telescoped into the other about 1 ft. for each section. The pole is set in the ground 8 ft., allowing 1 ft. in the ground for each 10 ft. of pole.

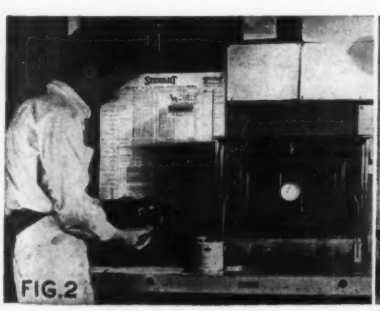



Fig. 2. Applying the finish

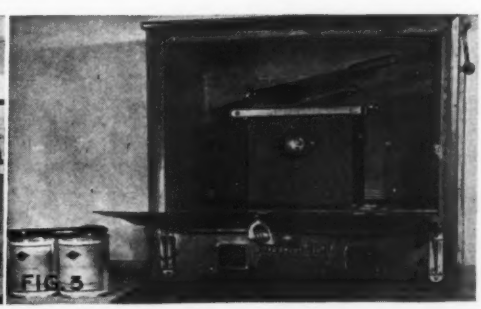



Fig. 3. Placing the project into the oven

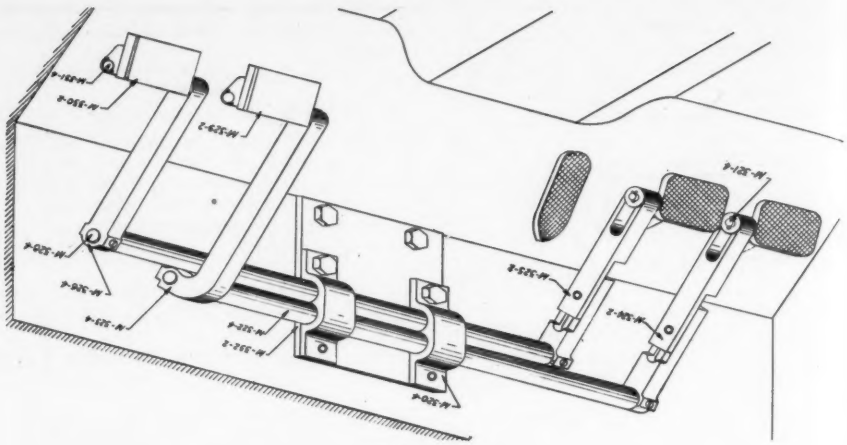
Fig. 2. Bottom section of flagpole

## DUAL CONTROL FOR 1940 BUICK

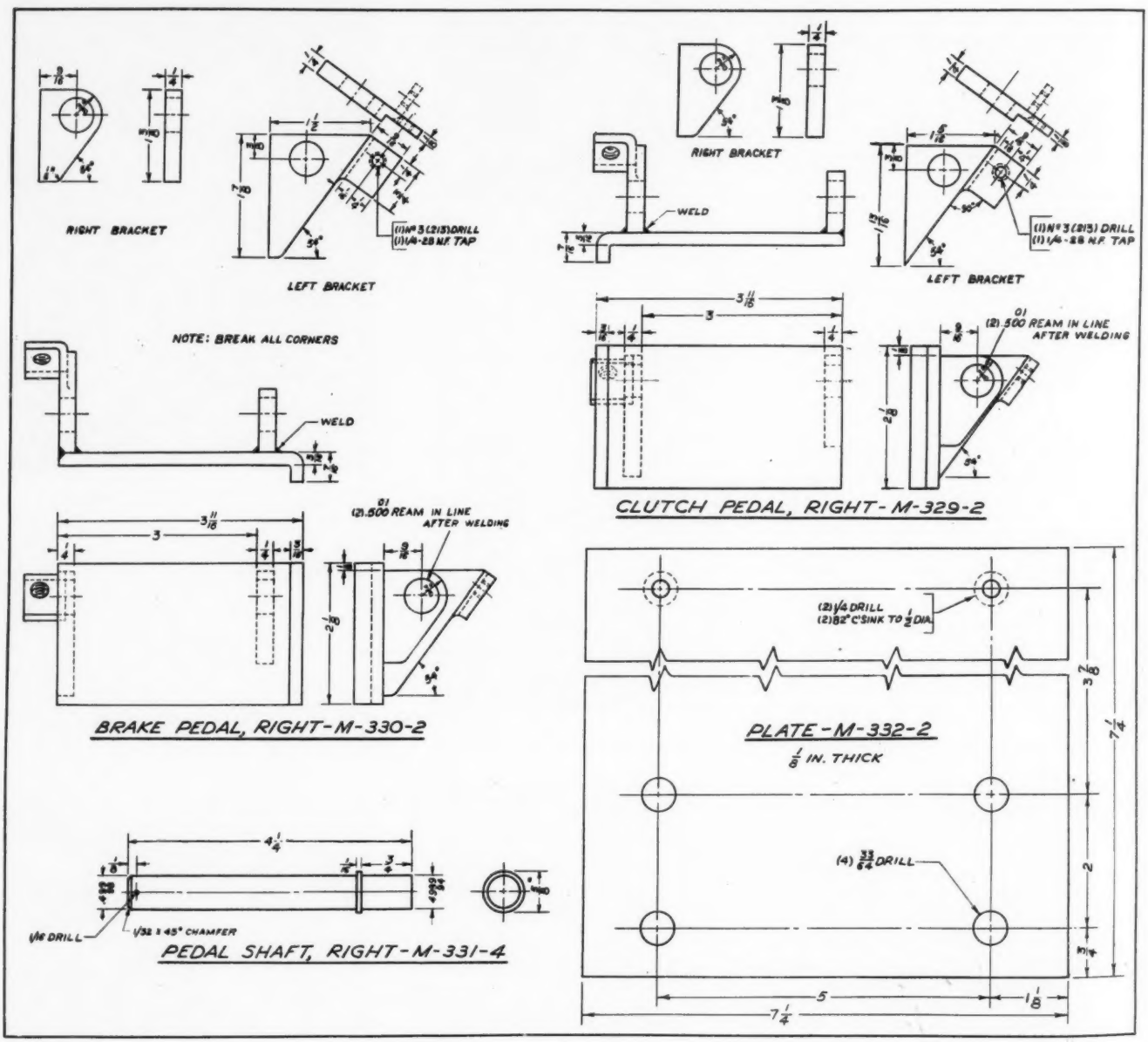
*R. S. Lindenmeyer*
**Director of Industrial Education**
**Waukegan Township High School**
**Waukegan, Ill.**

The dual control for the safety driving car resulted when a definite need for an easy operating unit that was also semiuniversal was felt by the safety driving instructor. Heretofore, when a new car was secured it necessitated buying a new unit or altering the old one considerably and, of course, the installation was always difficult under these conditions. The old unit was usually made in a hurry, without much ingenuity, resulting in poor action of the clutch and much wear on the clutch plates and lining.

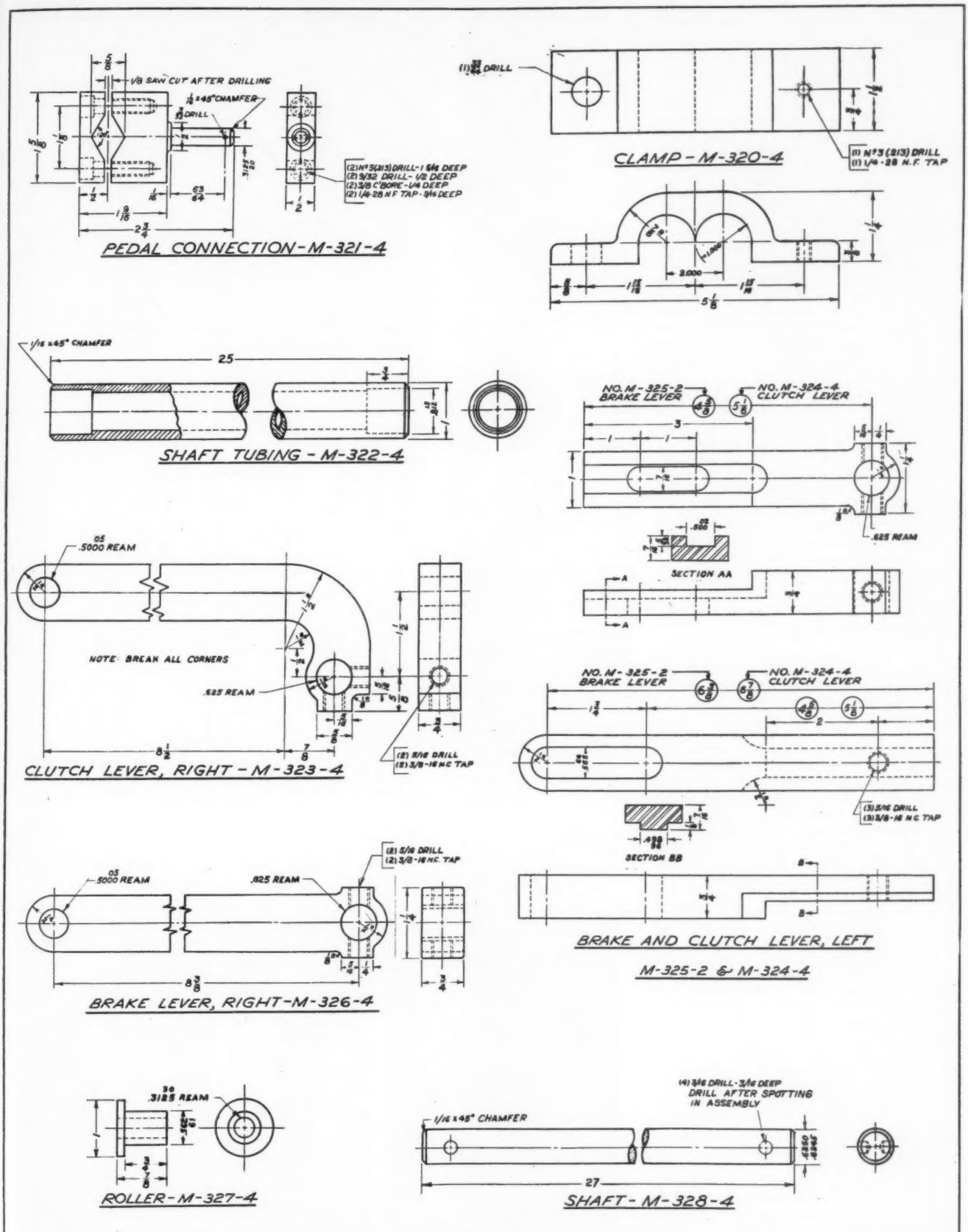
This new unit was developed through the cooperation of R. S. Lindenmeyer, director of the industrial-education department; E. J.



Assembly




Details for the dual control




Details for the dual controls

Neary, safety driving instructor; M. M. Thompson, head of the drafting department; Howard Jackson, advanced machine-shop instructor; W. V. G. Hoger and Howard J. Annis, instructors in welding and auto mechanics.

Some of the features that should be noted in the design are: ease of operation due to the use of Torrington needle bearings and a Zerk-type, grease fitting installed in the center of seamless tubing which furnishes lubrication. The pedals on the instructor's side are made to operate through an arc so as to be parallel to the driver's foot and the floor board at all times. This is also a safety feature as the pedal pad folds up in case a toe or foot is under it during operation by the student driver. The extension arms to the driver pedals are made adjustable to compensate for different makes and models of cars. Where these arms connect to the pedals, an ingenious device is used which does not interfere with the pedal action and is also adjustable and holds securely.

With very slight alterations this unit may be made to fit most cars used in teaching safety driving and it makes an excellent project for the various industrial shop classes.

The materials used cost approximately $5, and it is estimated that the labor necessary to make the unit commercially would be $10. Installation can be made by the driver or a good mechanic in from 3 to 5 hours, cost not to exceed $10.

## THE MAKING AND THROWING OF BOOMERANGS

*R. H. Jenkins*
**Humboldt State College**
**Arcata, Calif.**

A few years ago the writer took up the study of the construction and throwing of boomerangs, and has found the subject of much interest and enjoyment.

The boomerang is not a toy, but a scientifically constructed weapon which is not only a challenge to an individual's skill to construct, but still more to his ability to throw and throw accurately. As a matter of fact, a number of men prominent in political life have chosen boomerang throwing as a hobby.

The home of the boomerang seems to have been with the Bushmen of Australia, though the weapon is found in some instances among other primitive tribes. The Bushmen had two types, the return and nonreturn. The latter was used for hunting and the former for gaining skill in throwing. Used in the hands of a powerful native it is a weapon to be reckoned with and respected.

The laws governing a boomerang are enough of a scientific problem that one authority, writing in one of the encyclopedias, claims that the weapon cannot be duplicated, and another is positive that they can be made for only the right hand. However, neither claim can be substantiated for what has been made once can be duplicated, and pieces of wood which will fly properly when thrown with the right hand can be made to respond equally well when the left hand is used.

The boomerang's flight is governed by the laws that control the flight of a plane, though it is very doubtful if the natives thought in those terms. The easiest method to make a satisfactory return boomerang, therefore, is to keep in mind the air forces governing the flight of an airplane.

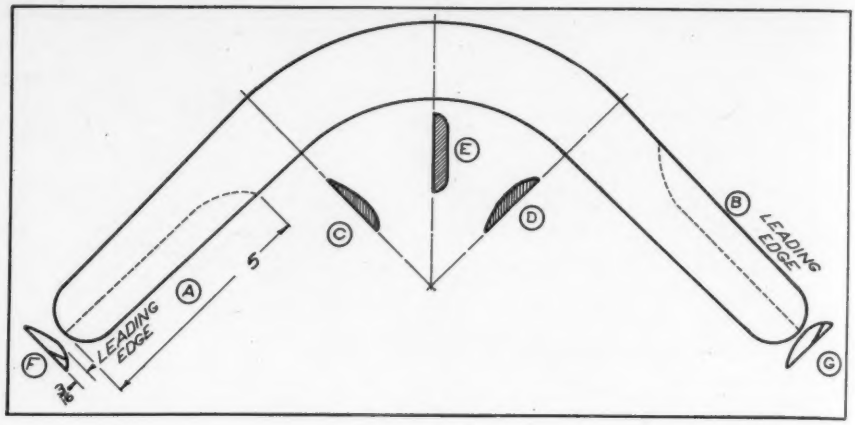



Fig. 1. The airfoils on a right-handed boomerang

One side of the boomerang is flat like the underside of the wings of a plane while the other is rounded. See Figure 1. The weapon, as shown in Figure 2, is thrown always in a vertical position, and as it straightens out to the horizontal, the curved side turns up in the exact position of the wings on an airplane. Now all that is necessary to gain a fair result is merely to round off these top edges. However, to be more accurate, the top side should be made exactly like the air foil of a plane. That is, the leading edge should be the heaviest and then slant off to a thin finish on the receding edge. See Figure 1. This will cause the air to be deflected upward, creating a lessened pressure on the topside of the weapon and making it possible for the boomerang to rise. A dihedral angle can be given to the boomerang the same as to the plane for stability, but this is not necessary if the air foils are well made.

It must be remembered that boomerangs are thrown from the vertical position with the curved side toward the operator. Each boomerang, too, has its own peculiar traits so that some will need to be tipped slightly out from this vertical position, though seldom over 10 or 15 deg. Never throw a boomerang horizontally as they are almost sure to land on a point and be broken.

As the boomerang starts on its flight it needs some factor to help in its return. To gain this end, one should cut a small beveled edge from the underside of each of the leading edges. This is shown at *F* and *G* in Figure 1. Then as the wings cut into the air, there is a steady pressure from underneath, causing the boomerang to describe a large ellipse or circle and this is the secret of the return. The deflected air current from the lower side keeps pushing the weapon around. The individual standing in the path of this ellipse finds his boomerang returning to him.

To make a left-handed boomerang, all that is necessary is to keep the same governing laws in mind. As the opposite hand is used, the curved side is turned accordingly. Thus, if the thrower is left handed he must hold the boomerang with the curved face toward him. This will reverse the construction. The leading edge of his air foil is now exactly opposite and so must be the bevel on the flat side. Otherwise the construction is the same. Figure 3 shows such a boomerang. Remember then, that the curved side is always toward the thrower for either hand, and that the

Fig. 2. Throwing the typical boomerang

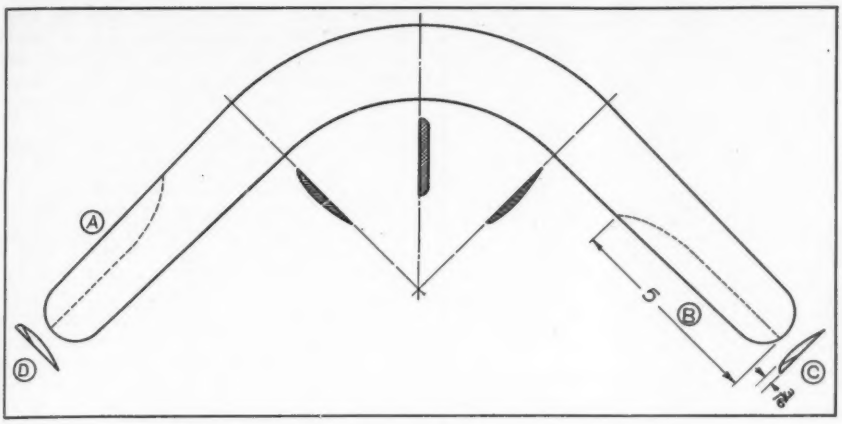



Fig. 3. The airfoils on a left-handed boomerang

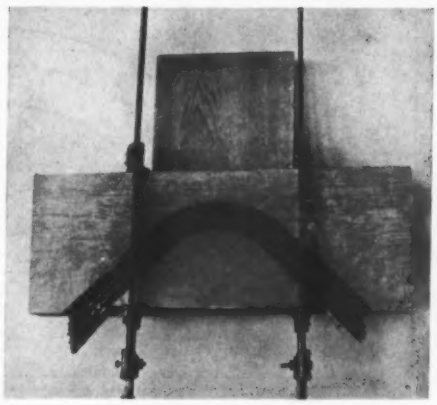


Fig. 7. The strips clamped in the jig

leading edges cut the air like a plane. Thus the left-handed boomerang is exactly opposite from the right.

After figuring a suggestive solution for the flight of a boomerang the writer next had to face the question of the curved construction. There are many shapes varying from nearly straight to a 90-deg. angle, but all seemed to be curved more or less and the best method for obtaining this curve was the problem to be solved. The natives bent the green timber or took the natural shapes from a tree.

A board with a joint in the center, like the one shown in Figure 4, could be used, but is inclined to weaken the piece. Steaming and pressing are all right but this process demands some type of press which might not be convenient for a small shop. With such problems in mind the strip method came into form. By ripping out strips about ⅛ in. thick and 30 in. long, building a jig, and using waterproof glue, the problem was nicely solved. This makes a stronger boomerang than the steamed and pressed variety as no steaming or cooking is necessary. A variety of colored strips can be used, making a most attractive piece of work. Hardwood should be used, such as oak, maple, or hickory. Cut the strips from full inch stock; unsurfaced will be all right. The jig, shown in Figures 5 and 6, should slide evenly so that the two edges of the curve will be parallel when 2½ in. apart. Rip out about 20 pieces and apply waterproof glue to each face until the entire bundle is glued. Clamp the pieces in the jig as shown in Figure 7, and let them set overnight. The resulting curved pieces will make two strong boomerangs when ripped in two and surfaced down.

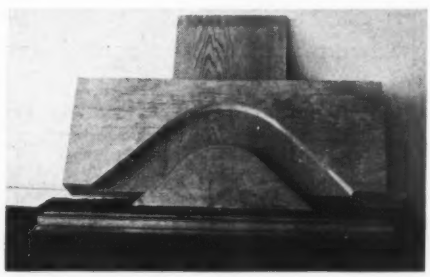


Fig. 6. The jig and strips ready for gluing

Surface the ripped stock down to a 3/8-in. thickness. Draw a full size pattern, using one of the illustrations shown in Figures 8 and 9 as a guide, and trace off this pattern on the prepared blanks. Cut out the shape of the boomerang on a band, scroll, or coping saw. Choose the face wanted for the top. Hold the blank in the right hand in the position for throwing, with this top surface toward you, and make a check mark on the two leading edges, that is, the edges which cut the air first. See Figure 1. Remember the leading edges are the ones which cut the air first. With a spokeshave, cut down the two ends into perfect wings similar to a plane. Carry this wing construction to the very center of the boomerang down to a little less than 3/16 in. in the middle and ¼ in. on the ends. Cut a light skew on the back side of the leading edges. These skews can vary in width and size depending on the action of the return. It is well to have enough to insure a satisfactory return and no more. It is usually well to try out the action by throwing. In fact, a variety in the return can be had from these

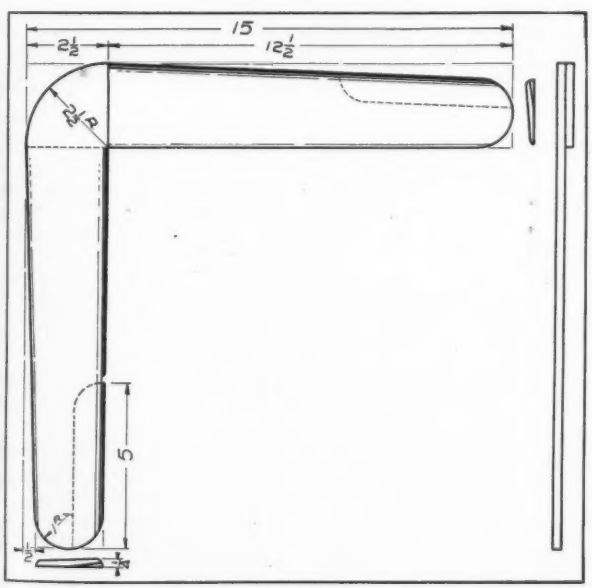



Fig. 4. The simplest way of making a standard boomerang

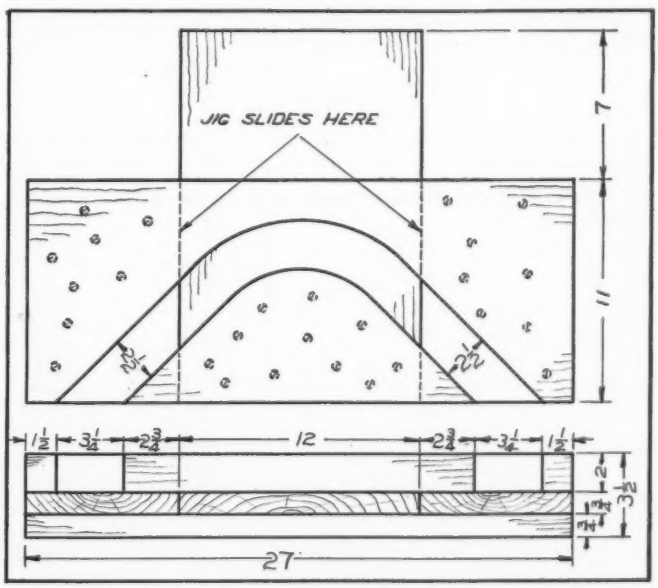



Fig. 5. Details of bending jig

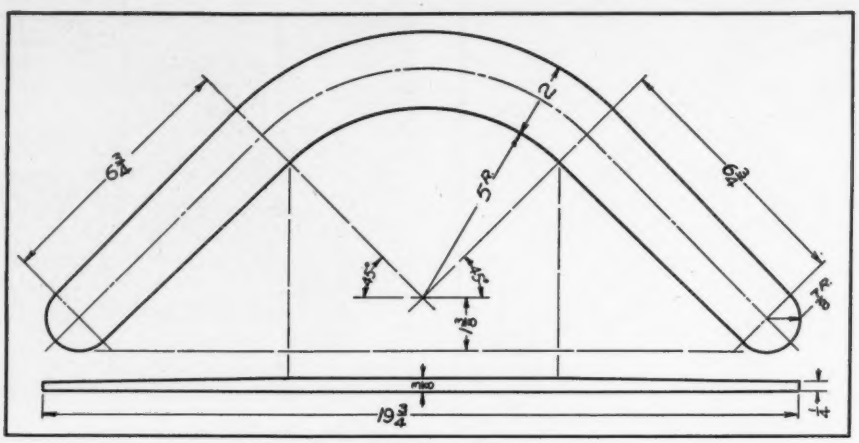



Fig. 8. A 90-deg. boomerang

skews. They usually stabilize near 1/5 of the length, 1/16 of the thickness, and about ½ the width at the ends. When all the shaving and testing has been done, sandpaper and varnish with a good grade of varnish. If taken care of, the boomerang will last for many months and give a great deal of pleasure.

To throw, choose a grassy or soft earth field as the boomerang will hit the ground with a great deal of force. The day, too, should be free from heavy winds which would carry the revolving weapon past the thrower. Aim to the right of any light breeze and throw hard giving as much spin as possible to the throw. Aim a few feet above the level of the eyes. Fix a point of aim, and throw at that point. Vary this point and the height and pitch of the boomerang until it returns to your feet. By pitch is meant the slant away from the perpendicular. Hard thrown boomerangs can usually be held more nearly perpendicularly than mildly thrown ones. The elevation, too, makes a great deal of difference in the return, also the amount of spin given in throwing. An interesting game is to make a 15-foot circle on the ground and two contestants throw to see who can get the first ten to land in the circle. It takes skill to throw steadily with just the same cast each time. Twelve consecutive times without a failure is a good record. The thrower can stand in or out of the circle. There is also the excitement of dodging the competitors' boomerangs while watching the flight of one's own.

However, while making a study of the regular boomerang, considerable experience,

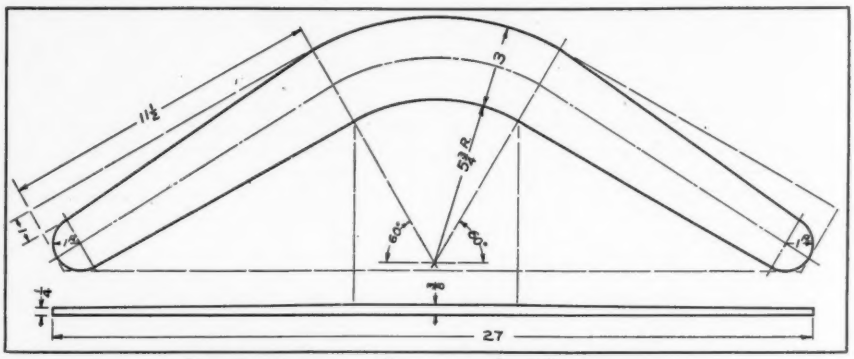



Fig. 9. A pattern for a standard boomerang

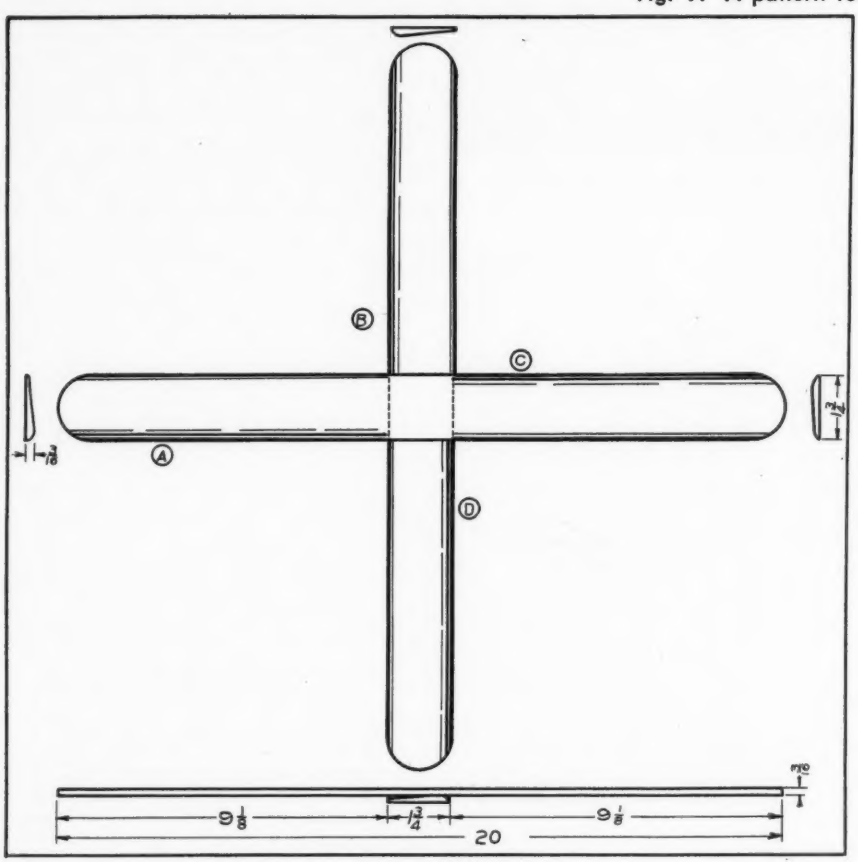



Fig. 11. Cross-stick boomerang

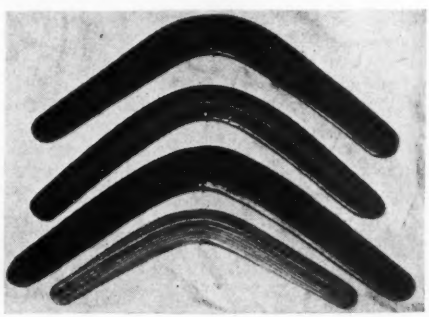


Fig. 10. A few standard boomerangs

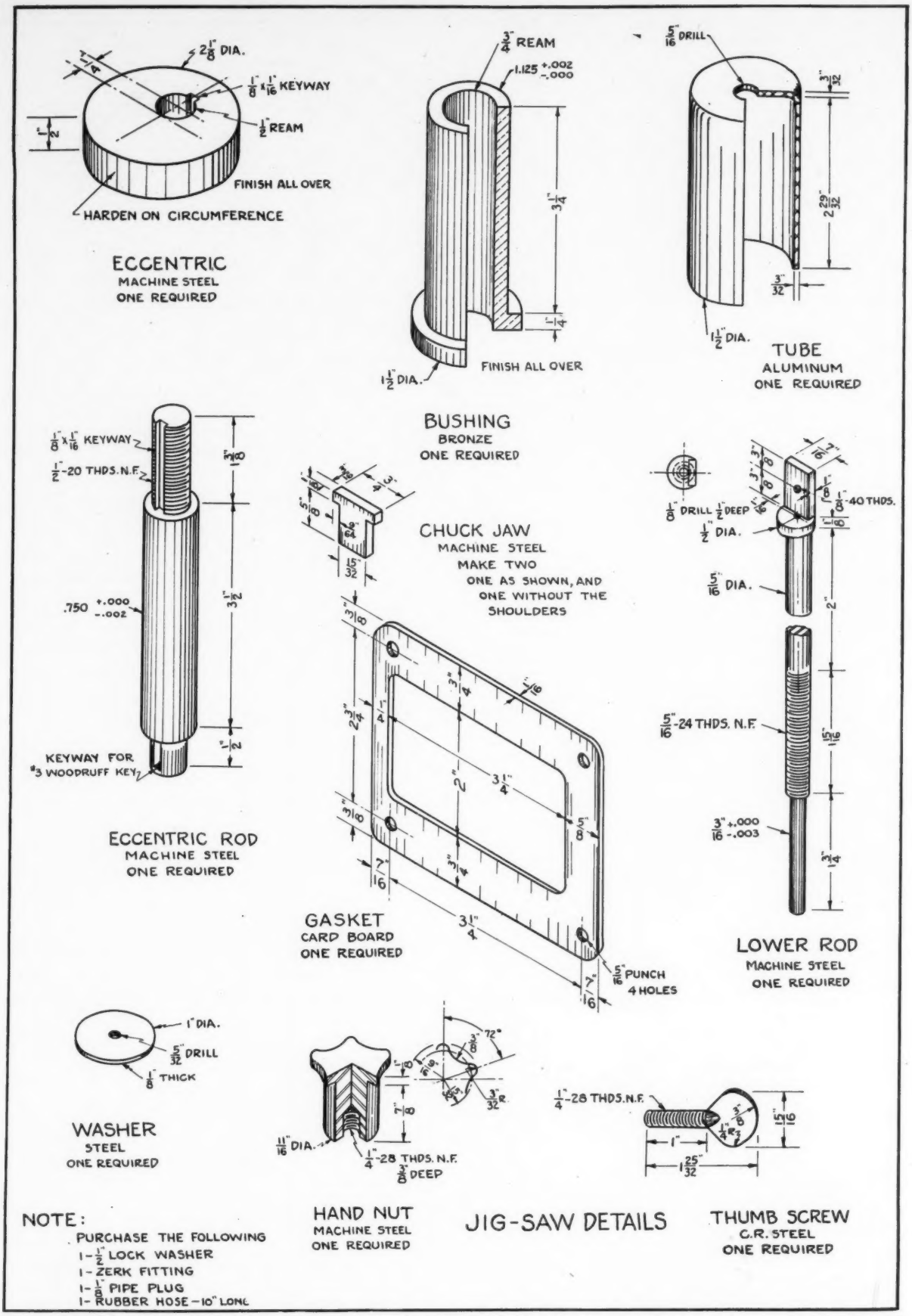
and a lot of fun can be had from making the cross-stick type, shown in Figure 11. These are quickly made and work with excellent success. The dimensions can vary a great deal depending upon the stock on hand. The wood should be light and easy to cut. A table of stock reads something as follows:

⅛ by 1 by 18 in.
⅛ by 1¾ by 20 in.
3/16 by 1¾ by 24 in.
¼ by 2 by 30 in.
¼ by 2 by 36 in.

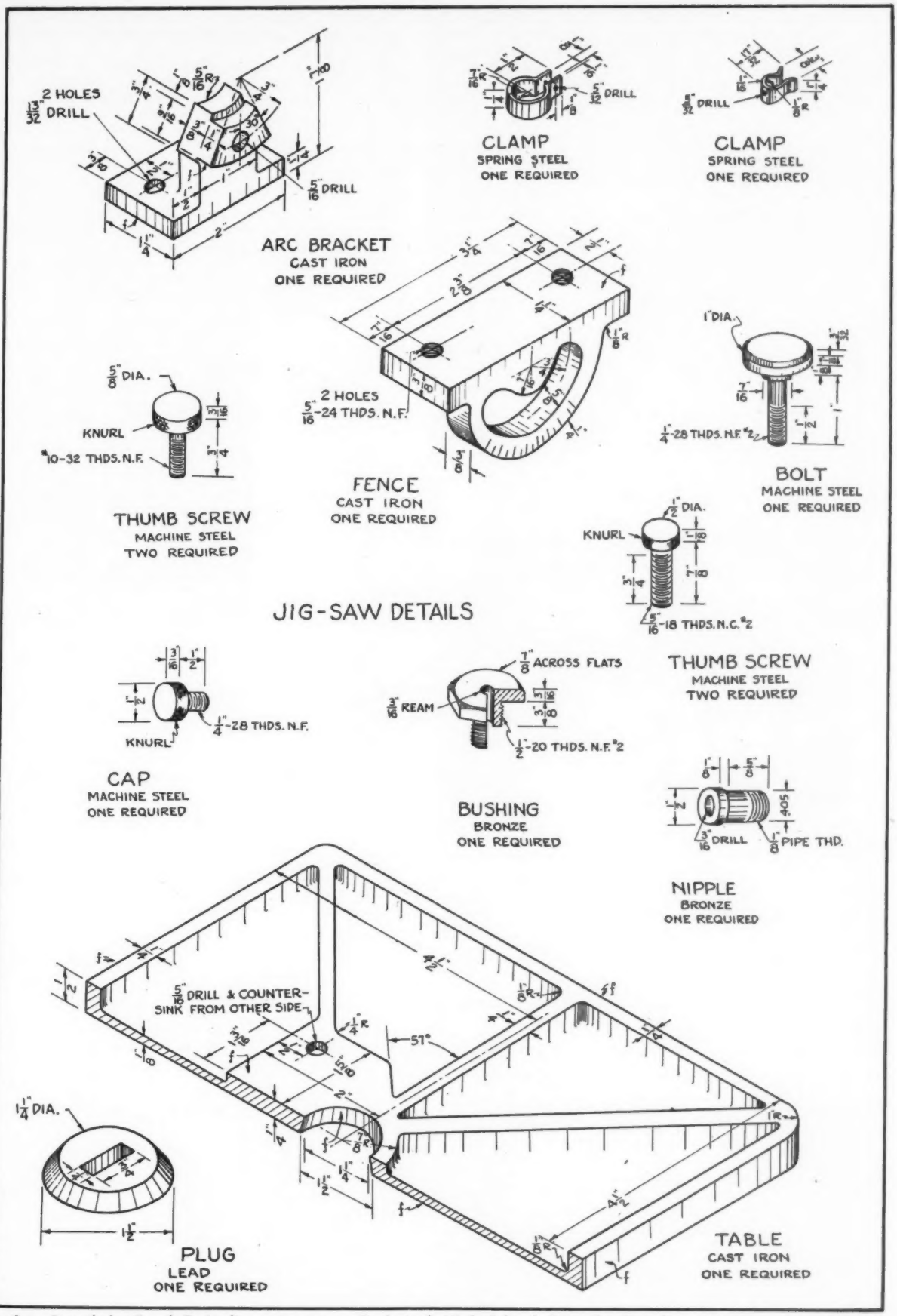
The first in the list can be made for throwing on the stage or in a gymnasium. The second is good for throwing out-of-doors and catching with the hands. The second, third, and fourth are good for out-of-door throwing and catching with a pin in the center.

In making the cross-stick type the two pieces are glued together in the middle with ordinary hot glue. No half-lap joint is neces-

(Continued on page 71)




Jig-Saw Details by Frank E. Anthony, instructor, Technical High School, Erie, Pa. For description see page 386 of the November, 1941, issue. For other jig-saw details, see pages 24 and 25 of the January, 1942, issue




Jig-Saw Details by Frank E. Anthony, instructor, Technical High School, Erie, Pa. For description see page 386 of the November, 1941, issue. For other jig-saw details, see pages 24 and 25 of the January, 1942, issue

(Continued from page 66)

sary, and this makes the boomerang just that much stronger.

After the pieces are glued, choose the side best suited for the top and holding in the right hand, mark the leading edges which will cut the air first as the weapon revolves. With a spokeshave, shape this top face into perfect air foils like the wings of a plane making the marked leading edge for the front of the plane. A skew on the back is not necessary unless the return is wanted to be more rapid. To throw, hold in a vertical position and throw out in a line a little above the level of the eyes. See Figure 12. Be sure the curved side is toward the thrower. If the model is large, it can be caught by the dowel pin fastened to the center. If small, the catching

Fig. 12. Throwing and catching the cross-stick boomerang

can be done by grasping with the flat surfaces between the two hands. If thrown horizontally, the cross-stick type does not fall and break, but turns over and floats slowly down. As described here, this air-foil type is right handed. To make a left-handed one reverse the process by holding in the left hand and marking the leading air-foil edge.

On the narrow and smaller type another method may be used. Instead of making the air foil from a leading edge, round off both edges, and then heat each wing at a point about 2/3 of the distance from the ends so as to bend upward and form a dihedral angle, as shown in Figure 13. Bend up so that the bottom of the ends are in line with the center of the top of the boomerang. This bend gives stability to the flight. A type of this kind is either right or left handed, but is thrown like the others with the curved side toward the operator and in a vertical position. All of the smaller cross-stick types can be caught with the hands.

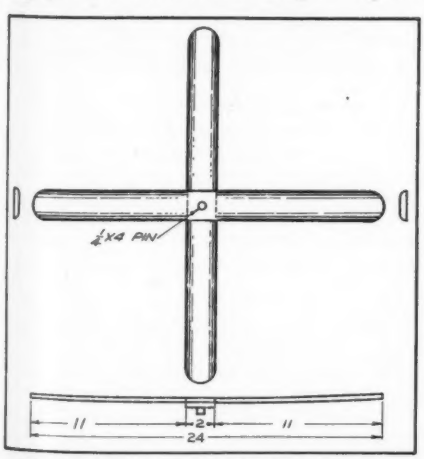



Fig. 13. Cross-stick boomerang with slight dihedral. Small models of this type may be made for stage demonstrations. This model may be thrown either right- or left-handed

An interesting effect can be had by painting with phosphorescent paint and throwing at night. Like the regular Australian weapon a great variety can be made with many variations. A still day is best for good throwing. The small ones also can be thrown from the stage over the heads of the audience. This makes a rather novel and exciting entertainment.

## TELEVISION

*Tilden Collar*
Downsville, N. Y.

Through the ages the thought of seeing things that are not readily apparent has engaged man's attention. Only recently, however, with the advent of television, has our dream of seeing things that occur beyond our line of vision come true.

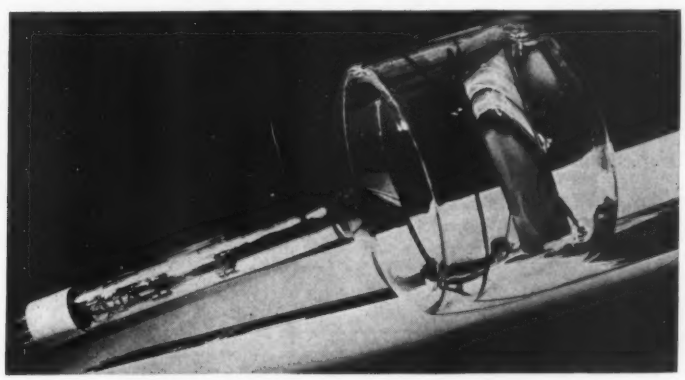
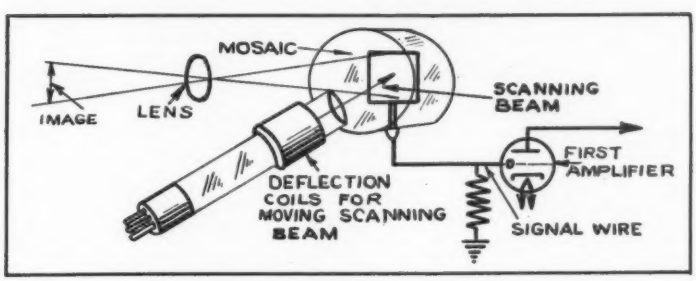


Fig. 1. Iconoscope, the electric eye of television




2. Diagram of iconoscope

The television program begins in the box which *views* the scene in the studio. The camera is a large box mounted so that it can swing in all directions to follow the program. The box contains a lens at one end which focuses the scene on a sensitive plate mounted in a vacuum tube within the camera. The sensitive plate is a mica sheet on which are deposited millions of drops of silver whose surfaces are sensitive to light. When light is focused on these drops of silver by the lens of the camera, they acquire a positive electric charge. The amount of charge acquired by each drop is in direct proportion to the amount of light falling on it.

The electric charge is then removed from the plate, bit by bit, through the agency of an electron beam which scans the plate in much the same way as the eye scans a page of printed matter. In other words, the electrical charges which exist on each silver drop are removed by the electric beam in the form of electric impulses and impressed on the transmission circuit. The variations in charge are carried to the transmitter where the impulses are impressed on an ultrashort carrier wave and radiated from the antenna.

The vacuum tube inside the camera is called an iconoscope. It is the electric eye of the television system. The main parts of an iconoscope are an electric gun and a photosensitive plate called the mosaic. Both parts are contained in a highly evacuated, drum-shaped, glass tube. The gun is placed at an inclined position of 30 deg. so as not to interfere with the projection of the picture upon the surface of the mosaic.

Minute photoelectric cells compose the mosaic. They are so small that they cannot be seen with the ordinary microscope. These tiny photocells are mounted on one side of a thin sheet of mica in such a way that they are electrically isolated from one another. A thin sheet of metal called the signal plate is attached to the other side. The signal wire connects to the signal plate.

The function of the mosaic is similar to that of the retina of the human eye. It transforms the light image projected upon it into an electrical nerve picture. The light image, falling upon the photo cells, charges them. The intensity of the charge set up in each cell is determined by the intensity of the light striking it. The darker the light area on the section of the mosaic, the weaker the charge on it; the brighter the light area, the

stronger the charge. In short, the mosaic changes the light image into its electrical counterpart.

The electron gun emits a fine beam of electrons which is focused to a point on the mosaic. The beam is moved horizontally and vertically, by the coils on the electric gun, over the neck of the iconoscope. One is used for horizontal deflection and the other for vertical deflection. The coil sets, containing magnetic fields, are driven by two vacuum-tube generators supplying a saw-toothed current. The electron stream is attached by the magnetic fields contained in the deflector

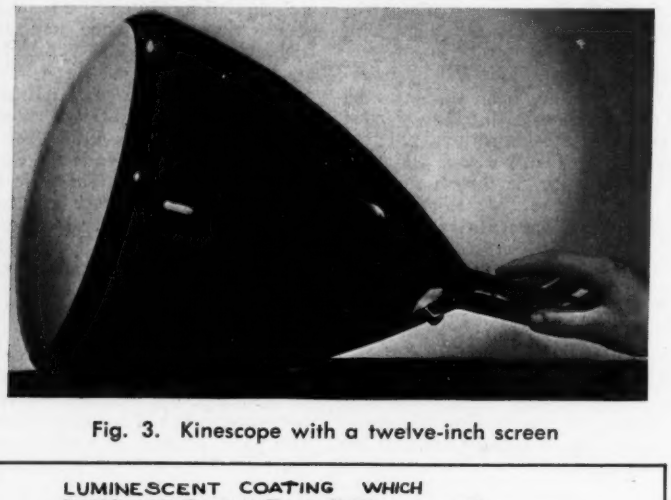
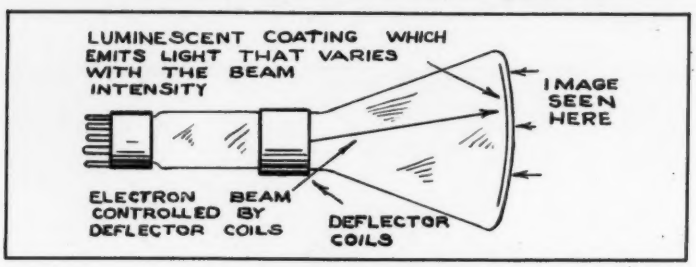
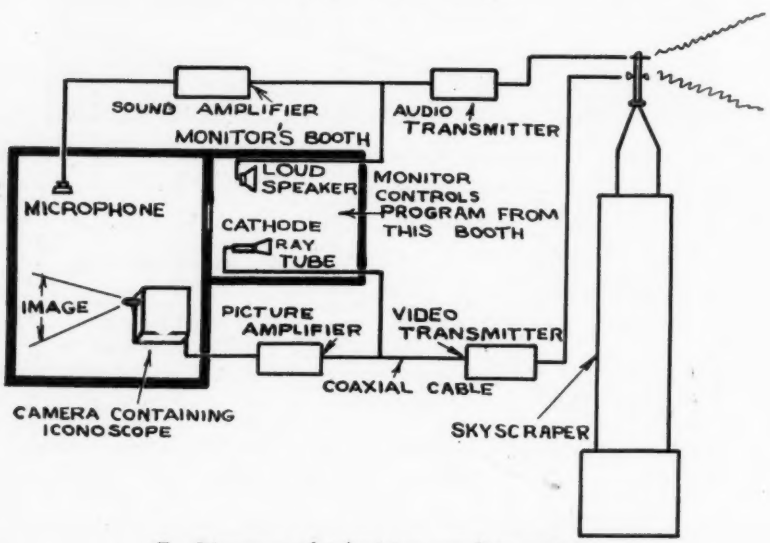


Fig. 3. Kinescope with a twelve-inch screen


LUMINESCENT COATING WHICH EMITS LIGHT THAT VARIES WITH THE BEAM INTENSITY
IMAGE SEEN HERE
ELECTRON BEAM CONTROLLED BY DEFLECTOR COILS
DEFLECTOR COILS

4. Diagram of kinescope




7. Diagram of television sending system

and so caused to scan the mosaic in a series of 441 horizontal lines from top to bottom. As the electron beam sweeps over the mosaic, one line at a time, the charge on the photocells is released, and a pulsating signal current flows from the signal wire. This current is amplified and superimposed upon a radio wave.

The scanning motion of the electron beam is produced by a pair of deflector coils placed coils. The saw-toothed currents, fed to the coils, influence the motion of the scanning beam, pulling it first one way, then the other.

At the receiver the process is reversed. The modulated carrier wave is picked up by the antenna and passed through the set. First it passes through the stages of amplification; then it is separated from the carrier wave and sent to the kinescope, a funnel-shaped, highly evacuated glass tube. Its function is to convert electrical impulses into light. Like the iconoscope, it is entirely electrical in its operation. There are no moving mechanical parts in it. The inside of the tube is coated with a fluorescent material made principally of willemite. This material has the property of

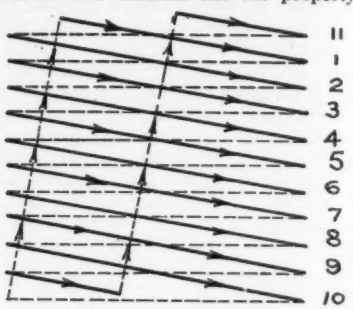



Fig. 5. Visualization of interlaced scanning

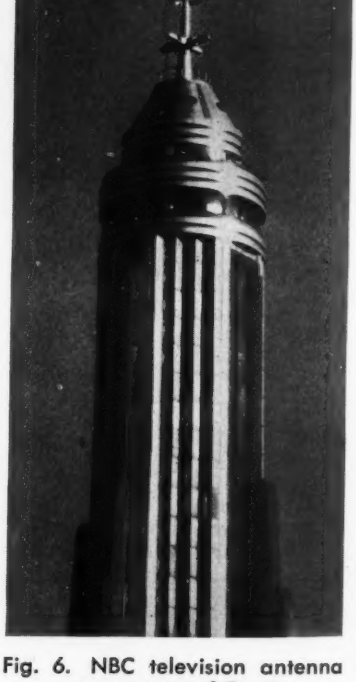


Fig. 6. NBC television antenna array on top of Empire State tower

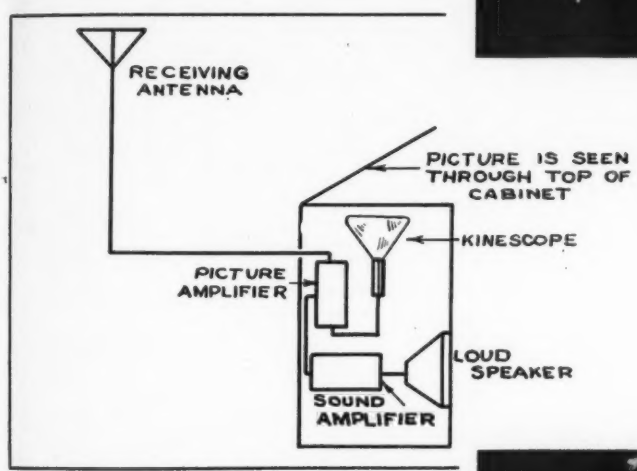
emitting light when hit by electrons. Light is produced when the electron beam strikes the fluorescent screen. Since the brightness of the fluorescent spot is determined by the intensity of the electron beam, it follows that there will be an exact correspondence both in position and intensity between the fluorescent lumination on the kinescope and the light image on the mosaic in the iconoscope.

The RCA television system uses 441 scanning lines, 30 frames per second with interlaced scanning. Present-day movies use 24 separate still pictures a second, but television uses 30 per second, a multiple of the power supply in the receiver. This minimizes the effect of hum or interference in the supply line. With interlaced scanning, the electron

beam moves back and forth 13,230 times a second. In one sixtieth second it will cover every other line and on the second sixtieth cover the intervening lines, the ones it missed the first time. It takes 1/30 of a second to cover the entire picture, yet the flicker frequency is 60 per second. During the first sixtieth of a second the beam will move back and forth 220 half times. Due to the half line, on the return of the beam from the bottom to the top of the picture, it will be halfway between the lines scanned on the first sixtieth second.

The scanning motion of the electron beam is produced by a pair of deflector coils — one for horizontal deflection and the other for vertical deflection — placed over the necks of the iconoscope and the kinescope.

NBC's television programs are put on the air from the transmitter atop the Empire State Building. This location is used because it is the tallest site in New York City. Two transmitters are used, one to broadcast the picture, and the other the sound. The video signal is transmitted on a frequency of 46.5 megacycles and the audio signal on 49.75.




8. Diagram of television receiving set

Waves of these frequencies are approximately 6 meters in length.

One of the properties of these high frequencies is that they tend to act similar to light, and travel in straight lines. They will be reflected from buildings and other objects, so in a city it is possible for the picture signal to arrive at the receiver by several paths. Due to the fact that the waves tend to travel in straight lines, the area of good reception is limited to the horizon line. Thus the transmitting antenna is located as high as possible to cover the greatest area. The diffusion or slight bending of the waves at the horizon enables the range to extend slightly beyond the horizon.

At present there are two methods of transmitting a television program. The first is by means of a coaxial cable. Physically it is a small hollow tube with a single wire running down the middle and prevented from touching the tube by tiny insulating disks which fit around the wire and fit inside the tube. The coaxial cable is needed to conduct the extremely high-frequency currents — from zero to 3,000,000 cycles per second — involved in television circuits.

The use of coaxial cable limits transmission to only those points to which it connects. To cover distance requires the use of an amplifier about every five miles, to make up for the loss in the cable. There is no practical limit for distance transmission over a coaxial cable, but the cost of installation is tremendous. The longest coaxial cable in this country runs from New York to Philadelphia — installed and used for tests by the telephone company.

The second method of transmission is by radio. This is used to transmit the programs atop the Empire State Building to the receivers in the metropolitan area. The present range of this transmitter is 45 miles.

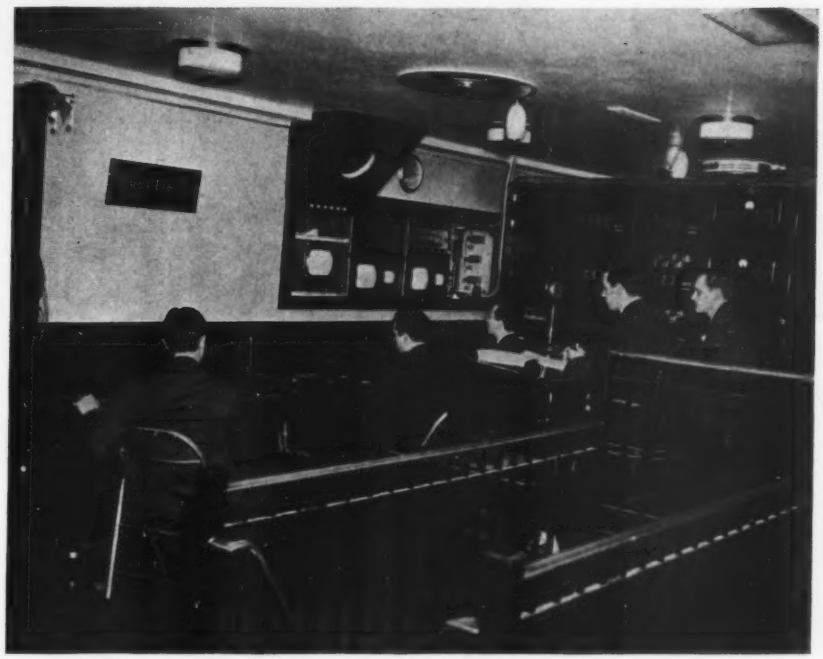


Fig. 9. Television control-board room

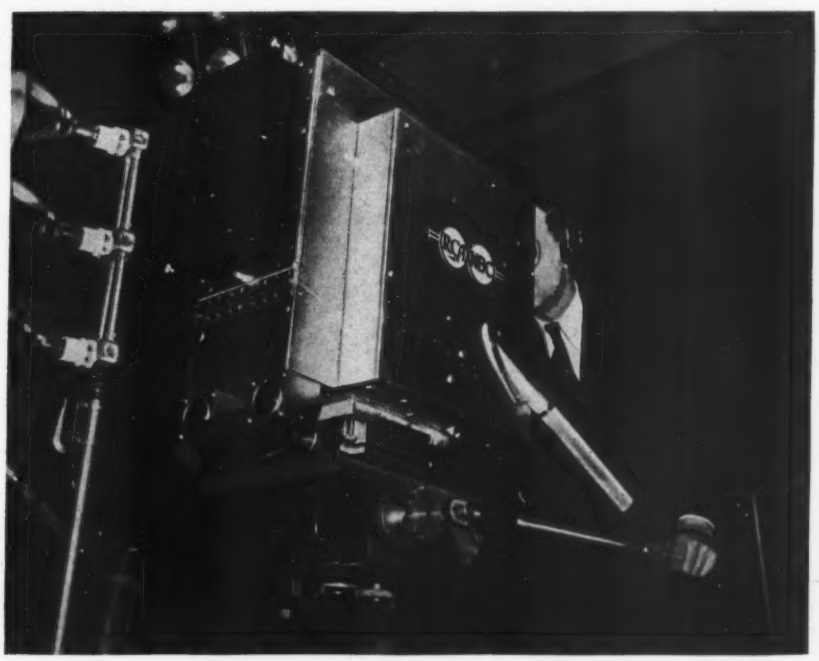


Fig. 10. NBC television camera

Fig. 1

Fig. 2

**Fig. 1 shows the tools that are useful in model-house building and Fig. 2 shows some of the materials that can be used**

## ARCHITECTURAL MODELS

*George A. Jester*

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**Milwaukee Vocational School**
**Milwaukee, Wis.**

Two previous articles have appeared by the author on the topic of Architectural Models in the October, 1940, and November, 1941, issues of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION. In the one presented herewith, the steps involved in doing the rough framing of a house are discussed and illustrated. The same model that was described in the November, 1941, issue of this magazine, will be used in the present article. Figure 1 shows some of the tools that are used in model building. Reading from left to right on the top row we have the single-edged razor blade often used in model airplane work, then the ordinary 10-cent blade and handle (replaceable blades, three for 10 cents), then four assorted shapes of blades made of a good grade of steel and finally a Schick knife. The machinist's steel rule makes the best kind of a straightedge to use as a guide in cutting. In the foreground can be seen three of the brushes used in painting the models.

Figure 2 shows some of the materials that may be used by the model maker. In the background can be seen a large piece of plywood which is used for shingles on scale models of ½ in. to 1 ft. This material can be purchased in 1 by 3-ft. pieces and is sold by the square foot. Standing against this piece of plywood is a tube of airplane cement. Immediately to the left of the cement is a piece of sponge rubber. On the extreme left is shown a small piece of Du Pont sponge. At the right of the tube of cement is a box of map pins. Some of these materials may be purchased at any 10-cent store. A piece of balsa wood lies in the foreground.

All of these materials will be found useful in giving realism to the model. For example, the finials on the ridge of the roof were made with map pins. The gutters and downspouts and the ornamental fence on the front porch of the house were made of balsa wood. The shutters were also made of balsa.

The model described in this article, was made in the presence of the classes in architectural drafting. Some of the students in these classes were taking carpentry in addition to their drafting. Others were in sheet-metal, electrical, or other building trades classes.

A large piece of masonite was secured on which to construct the model. The next step was to lay out the wall outlines on the masonite. This was followed by the laying of the foundation wall. In this case it meant cementing wooden strips to the masonite base. The I beam for the joists was then placed in position. It is shown directly under numbers 5 and 8 in Figure 3. The headers were then placed in position and the floor joists (2 by 10's — 16 in. on center) cemented in place.

The writer allowed many joists to span the entire house because they were later to be hidden entirely from view and this meant less material to handle and made possible the speeding up of the assembling of the model.

The numbers on Figure 3 indicate the following:

1. Foundation wall
2. Headers
3. Beam filling of basement wall
4. Bridging of joists
5. Method of lapping joists over I beam
6. Rough flooring laid diagonally
7. Doubling of joists at point of main bearing partitions
8. I beam
9. Doubled joist or stringer around stair well.

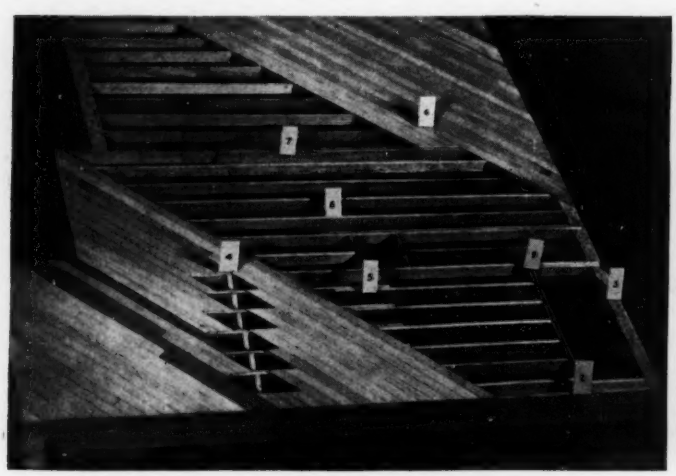


Fig. 3. Starting the model from the ground

Fig. 4. Laying the rough floor

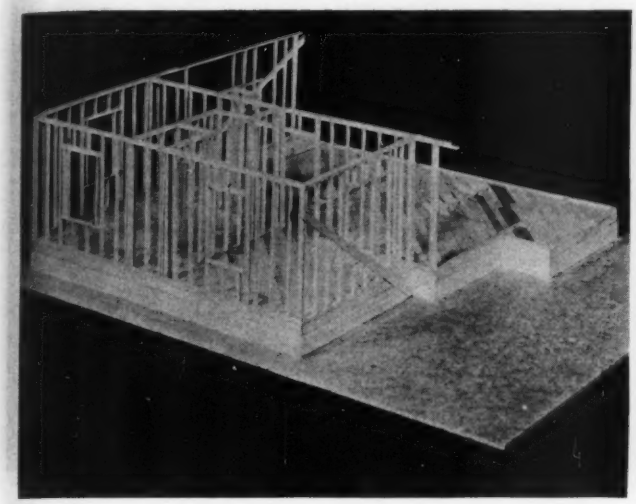


Fig. 5. Raising the walls

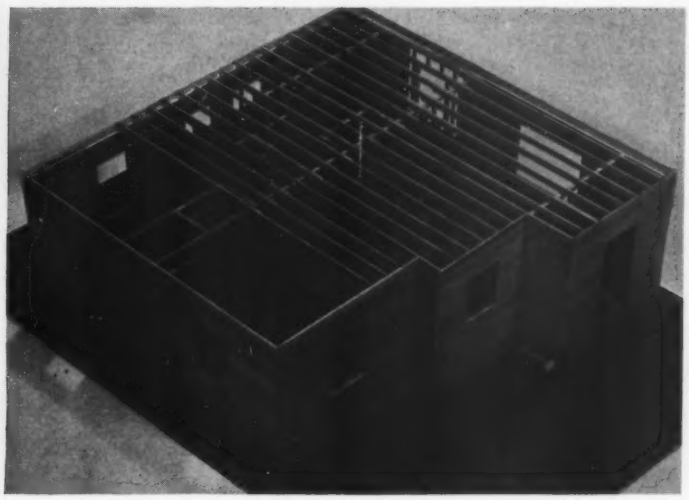


Fig. 6. Putting on the sheathing

Figure 4 shows the rough floor completely laid, except where it was purposely left out to illustrate the bridging and the like. The 2 by 4 plates were then placed in position to give the wall outline or room arrangement.

After the plates are in place, the model maker is ready to raise the walls. This is a more or less tedious job, because it is often necessary to work from the inside toward some open space. The stock is small, and especially in closets, the space is very much constricted.

Figure 6 shows the side walls and partitions completely framed. This figure also shows some of the ceiling joists in place and the rough sheathing over the studding.

The next two Figures, 7 and 8, show quite a jump from what is shown in Figure 6. The gable ends are first raised and then sheathing is put on.

Next the ridge board is run through the center and the rafters are then fastened in place. Then the roof boards are put on the main portion of the house, over the small gable at the front entrance, and over the shed roof over on the portion of the living room that juts out at the front of the house. The roof boards are laid with spaces between them because of the use of wood shingles.

In Figure 7 it can probably be noted that the rough sheathing runs both horizontally and vertically. Large pieces of material were used to quickly cover those portions that were not going to be visible on the completed model. Building paper had to cover this anyway.

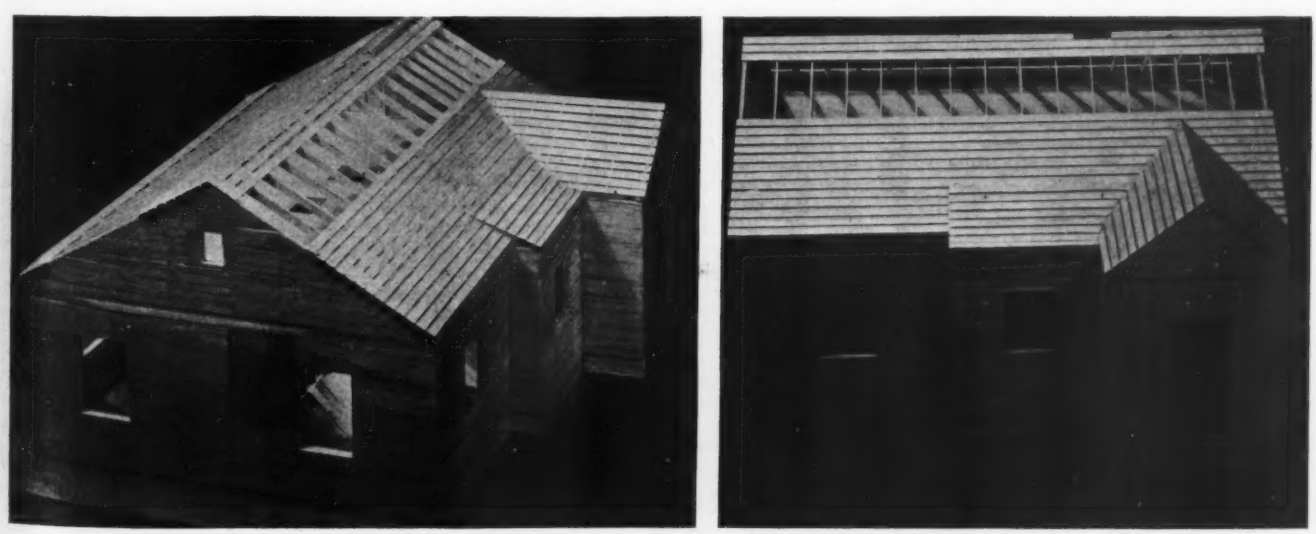
Figures 9 and 10 show the model as it is to be left when used in the drafting room for purposes of illustration. As shown in Figure 9, the frame has been put in place for the one window, while the other window has been provided with both sash and frame. The flashing has been placed around the chimney and in the valleys. Some shingles have also been laid on the small shed and gable roofs and siding has been put over a portion of the front of the house.

Figure 10 shows the side elevation with rough window openings and rockwood insulation in a section of the wall between the studding. Sheet celluloid was used to hold the insulation securely in place. Real building paper was used to cover the sheathing on the entire model.

Figure 11 is a model of the same house, made to a scale of ½ in. to 1 ft. On this particular model, plywood was used for the siding, shingles, and brickwork. The foundation and chimney were of brick.

A coping saw, a flat file, and a small drill were used to cut and shape the window and door openings. Pine and balsa were used for the door and window frames and casings. A block plane smoothed all edges. Corners were mitered and very few nails were used. A jackknife was used for the necessary scoring and a chisel did the cutting of the siding for the casings.

The instructor will find that a model of this kind is an ideal visual aid. Models are always used in mechanical and machine-drawing classes. If a class can actually see and handle a project such as this, the work of the instructor will be more effective. One can speak about beam filling, for instance, and not really



Figs. 7 and 8. Putting on the sheathing and roof boards

Fig. 9. The front of the house as finished for use as a demonstration model

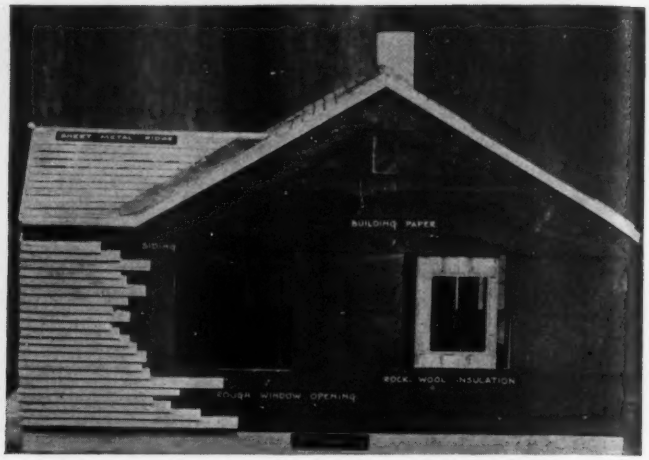


Fig. 10. The side of the house as finished for use as a demonstration model

know whether the student gets the point or not, but show him what it is and you know he can understand it at once. Scale models can be made of many types of construction. In fact, models can be made of many of the problems to be drawn in the classroom. Try it and see how much pleasure the boys get out of doing the work of model making, not to say anything about the added interest that can be developed in the course being taught.

## A UNIT OUTLINE AND A PROGRESS RECORD FOR THE WELDING CLASS

*Stan L. Fox*
**Senior High School**
**Grosse Point, Mich.**

The outline of the mild steel welding unit, and the progress card described herewith have been used successfully in the author's welding classes, and may be helpful to other teachers of trade and industrial subjects in part-time schools.

WAUSAU SCHOOL OF ADULT
AND VOCATIONAL EDUCATION

Welding Department
Student Progress Record

Name_____
Classification_____ Time_____ Day_____
Admitted_____ Withdrew_____

Oxy-Acetylene Welding

| Unit | Assign. | Job | | | | | | | | | | Test | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 2 3 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 1 | 2 | 3 |
| 1. | | | | | | | | | | | | | | |
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| 5. | | | | | | | | | | | | | | |
| 6. | | | | | | | | | | | | | | |

Certificate_____
(date)

A.C. Electric Arc Welding

| Unit | Assign. | Job | | | | | | | | | | Test | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 2 3 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 1 | 2 | 3 |
| 1. | | | | | | | | | | | | | | |
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| 9. | | | | | | | | | | | | | | |

Certificate_____
(date)

Fig. 1

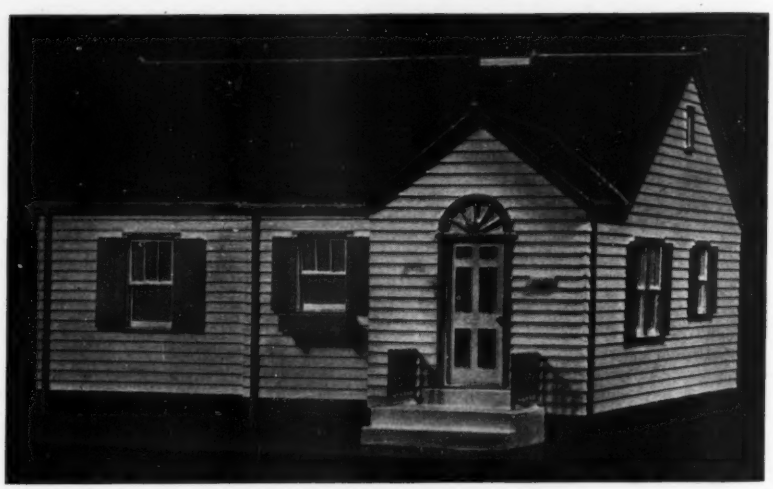

Fig. 11. A completed model of the same house used for the model shown in Figs. 9 and 10

Most of the teachers in these schools will agree that because of the multitude of problems encountered, a high degree of instructional efficiency is necessary. The instructional material used must be carefully prepared. It must be workable with a student group whose purpose, progress, and ability varies greatly. Students in such schools, or in any school for that matter, want to and should know what they are going to do — what is expected of them.

A series of unit outlines used in conjunction with the student progress record card, shown in Figure 2, seems to help meet these requirements. The unit outline describes the assignments, jobs, and tests which must be completed by the student for each unit of the course, in this case oxyacetylene welding.

This course is divided into five such units. They are: (1) mild steel welding, (2) bronze welding, (3) cast-iron welding, (4) cutting, and (5) production welding. The outline shown herewith covers the first unit, mild steel welding. There are outlines like this one for each of the other four units of the course.

Outlines are given to the student upon his entrance into the class. They become his property and are placed in his loose-leaf notebook for daily reference.

Believing that the student should know something about the job confronting him, prior to tackling the job itself, one to three reading assignments are included first on the outlines. These assignments generally refer him to another sheet containing questions relative to the material to be read. Short lectures and demonstrations often parallel these assignments.

Typical welding practice jobs are listed following the assignments. There is one *key* instruction sheet to give instructions for all jobs in Unit 1, *Mild Steel Welding*. The teacher gives special instructions, other than those given on this sheet, whenever needed for any particular job in this unit. The student is referred back to a *key* sheet for instructions on all jobs listed. There are similar sheets for the other units. The only major difference between jobs 1, 2, 3, 4, etc., is in the size of the metal, type of joint, position, and type of rod to be used.

Tests covering the informational and manipulative content of the various units are given to complete the instructional procedure. These tests are also noted on the outline.

The student progress record card shown in Figure 1, is kept for each student. These cards are 5 by 8 in. They can be kept conveniently in a small, alphabetized, loose-leaf notebook. A check mark or grade is placed in the small square on this card when the student completes any one assignment, job, or test. This proves an excellent way to quickly record and check students' progress since they progress at varying rates.

### Outline of Instruction
### Unit 1 — Oxyacetylene Welding
### Mild Steel Welding

Assignment 1 — Study information sheet on "Welding and Cutting Apparatus Instructions."

Assignment 2 — Study information sheet on "Precautions and Safe Practices."

Job 1 — Light and adjust an oxyacetylene torch for welding.

Job 2 — Weld 2 pieces of mild steel, ⅛ by 1 by 4 in., edge to edge at 45 deg. Keep the pieces in a horizontal position and use no welding rod.

Job 3 — Weld a single V butt joint between 2 pieces of ¼ by 1½ by 4-in. mild steel. Keep pieces horizontal and use a ⅛-in. filler rod. Repeat until test shows satisfactory results.

Job 4 — Weld a single V butt joint between 2 pieces of steel ¼ by 1½ by 4-in. mild steel. Keep pieces in a vertical position, and use ⅛-in. filler rod. Repeat until test shows satisfactory results.

Job 5 — Weld a single V butt joint between 2 pieces of ¼ by 1½ by 4-in. mild steel. Keep pieces in a horizontal position, and use ⅛-in. filler rod. Repeat until test shows satisfactory results.

Job 6 — Weld a single V butt joint between 2 pieces ¼ by 1½ by 4-in. mild steel. The pieces are to be kept on an overhead and ⅛-in. filler rod is used. Repeat until test shows satisfactory results.

Job 7 — Weld a double V butt joint between 2 pieces of ½-in. round mild steel. Keep the pieces in a flat position, and use ⅛-in. filler rod.

Job. 8 — Same as for Job 7, but use 2 pieces mild steel ¾ by ¾ by 4 in.

Job 9 — Weld a T joint, between 2 pieces of ¼ by 1½ by 4-in. mild steel. Keep the pieces in a flat position, and fillet both sides. Use ⅛-in. filler rod, and repeat until test shows satisfactory results.

Job 10 — Build up several lugs of varying sizes. Repeat until test shows satisfactory results.

Job 11 — Same as for Job 9, but weld in the vertical position.

Job 12 — Design some project to be welded. Submit drawings and bill of material to instructor for approval. Complete the project.

Test 1 — Setting up, care and operation of oxyacetylene welding and cutting apparatus.

Test 2 — Safe practices with welding equipment.

Test 3 — Applications of oxyacetylene welding.

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## GRAPHIC-ARTS PROGRESS

*R. Randolph Karch*
**Principal, Printing High School**
**Cincinnati, Ohio**

The handling of objects causes more accidents than any one other factor in the printing and publishing industries. Presses, oddly enough, rank fourth as the causes of such accidents. As stock handling is one job done quite frequently by workers, boys in school printshops should be continually warned about the dangers involved.

Because of the hazards attending the drying of sheets on printing presses by open gas flames, an investigation should be made of the new method of infrared ray drying. Several lights similar to the incandescent type are hooked up in rows, and the pile of stock is dried from within by this process. Many experiments are now being made by firms, with this method of drying, in various parts of the country. One manufacturer has already placed drying units on the market.

A recent study shows that such trick expedients as curved and circular lines, angles and the like, make reading so difficult in advertisements that the added expense of such type composition does not pay in returns of sales. Such tricks are simply too hard to read. The usual rectangle with simple display is found best. Likewise the word "sale" is of little effect on the buying public.

A laminated structure called "Bista" make-ready is sold by several electrotypers to the users of these plates. A pressman becomes adept in a short time in separating the laminations in the process of make-ready, according to the variations needed.

Mounting lumber for original and duplicate plates may be purchased now with lines on the pica scale, so that centering and angular adjustments may be worked out with little trouble.

To eliminate paper labels on bottles, a new press has been invented by a Canadian which prints directly in four colors on the bottle itself. The bottles are fed automatically to the printing press.

Standards in presswork are slowly materializing, and we are informed that more than two patches per column of body type make-ready is too much. Any machine-set type that needs more than this is below standard, and calls for better precision methods.

Chalk overlays may now be purchased in a large city from a trade plant set up for this purpose. This etching away of the high lights, and leaving solids higher, is becoming more and more popular. The hand cut overlay for such make-ready work on halftones is becoming passé. These mechanical overlays, so called, are said to last for two million impressions.

When it is necessary to provide new lighting units for an old shop, it is well to study the possibilities of fluorescent lighting. In one plant, after installation of the new units, as much as 70-candle power was found on the working spaces, and 35-candle power on the floor. The cost of lighting was decreased from 5½ cents per hour to 4 cents per hour.

The tracing of layouts for customer visualization of the finished piece of printing is fast becoming more popular. The idea of the layout is to keep the customer from making changes on type that is already set. If he makes them on paper, it does not cost so much. In one English plant, jobs are actually sold by the layout, and the finished piece does not vary one iota from the original.

To combat the inroads made on letterpress printing by offset lithography, printers are experimenting with the step-and-repeat printing machines which have made such great progress for lithographers. The printing from original plates by letterpress, rather than from electrotypes made from photoengravings, saves in the cost of originals, duplicates, registering time for imposition, and press preparation. Recently a 19 by 25-in. sheet containing 25 labels in two colors was prepared on the press in less than two hours.

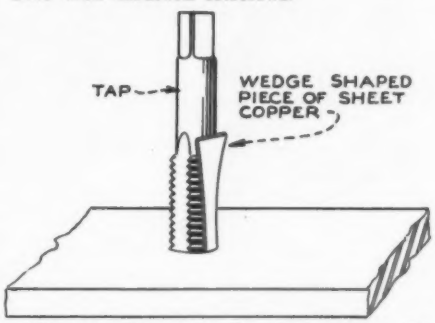
The large government orders for paper stocks are given priority over school orders. Therefore it behooves the shop teacher to anticipate far in advance his needs for bond and book and index bristol. He might well look into the possibilities of substituting other stocks for high content rag, as this seems to be needed in tons by the government. There may be difficulty in getting stock for school posters, too, as it is claimed that the government is taking 40 per cent of the boards for shell casings and packing boxes.

Paper plates for small lithographic machines will be announced soon. The new plates will make either line or half-tone work. This will aid the defense program which needs zinc and aluminum.

## TO ENLARGE A TAPPED HOLE

*J. H. McCloskey*
**Senior High School**
**Lakewood, Ohio**

It frequently happens that a stud bolt or setscrew fits too tightly. If an adjustable die is available, the threads on the bolt may be recut so as to make them fit more easily into the tapped hole. This, however, cannot be done with hardened setscrews.




The only alternative then is to enlarge the tapped hole. To do this, place a wedge-shaped piece of copper into one of the flutes of a tap, and then run the tap through the hole. In this way, it is possible to obtain the fit that may be desired.

This handy kink was obtained from Mr. Maudsley, a stationary engineer employed by the Board of Education, St. Louis, Mo.

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Young man, don't be satisfied. Be forever filled with dissastisfaction. But be dissatisfied with yourself, not with luck, or fate, or your job, or your boss, or your start in life. Be dissastisfied with yourself while you are young, and you will find the world will become more and more a satisfactory place as you grow older.

— *Arthur Brisbane*

The big rewards come to those who will travel the second, undemanded mile.

— *Bruce Barton*

# Whittling-Jacknife Technique

W. BEN HUNT
Hales Corner, Wis.

(*Continued from page 39 of the January, 1942, issue*)

Whittling miniature birds will be found very interesting. They may be painted or left in the raw wood to show how proficient the whittler is, or they may be sandpapered smooth. Small birds usually look better after sanding, especially if they are painted.

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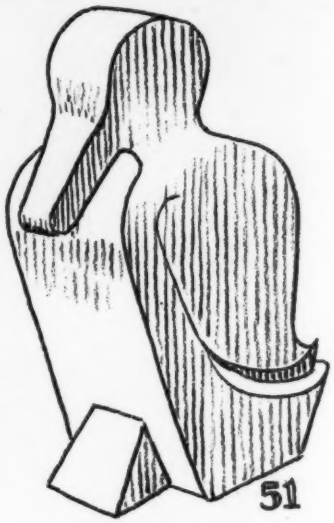
Figure 48 shows a duck in relief without the background. Trace and transfer the figure to a ½ by 4 by 6-in. board. Make a vertical cut all the way around the figure, and cut away the background as shown in Figure 49. The forepart shows the finished background, while the other shows the first cuts. An Indian crooked knife, such as was described on page



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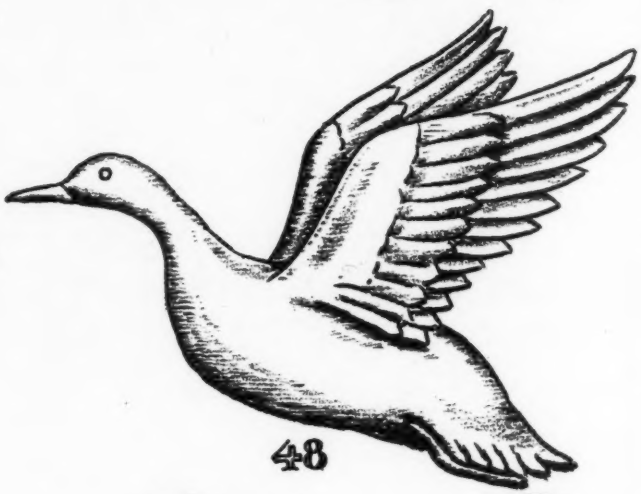

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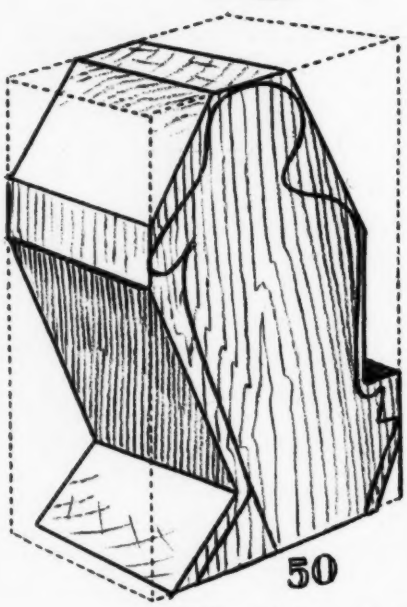

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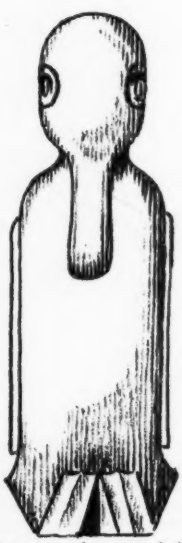

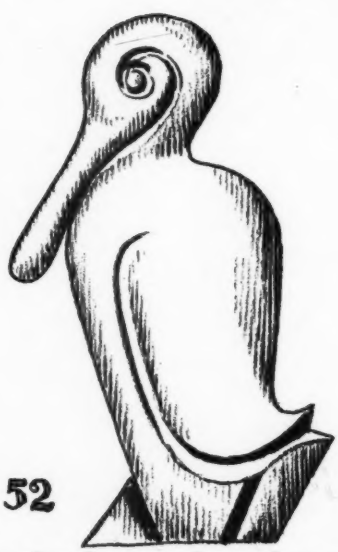

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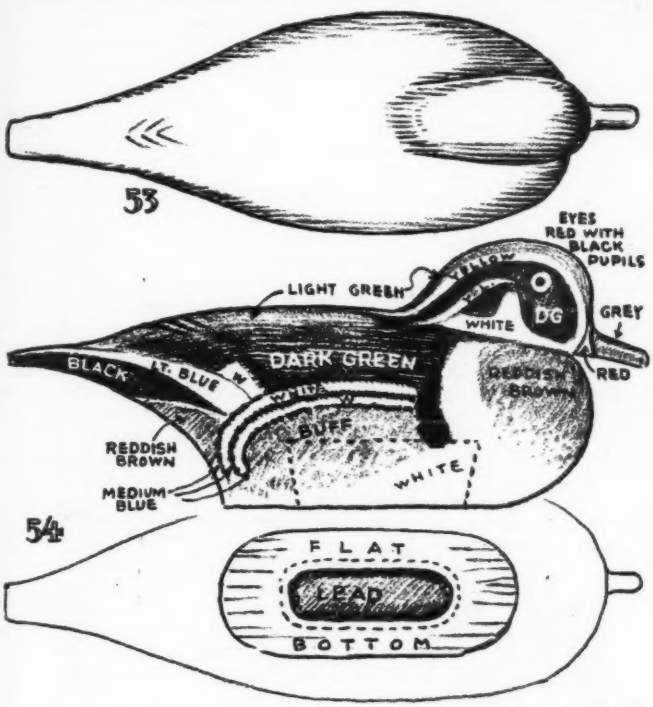
NOTE: All line cuts in this article are full size so that they may be used as patterns

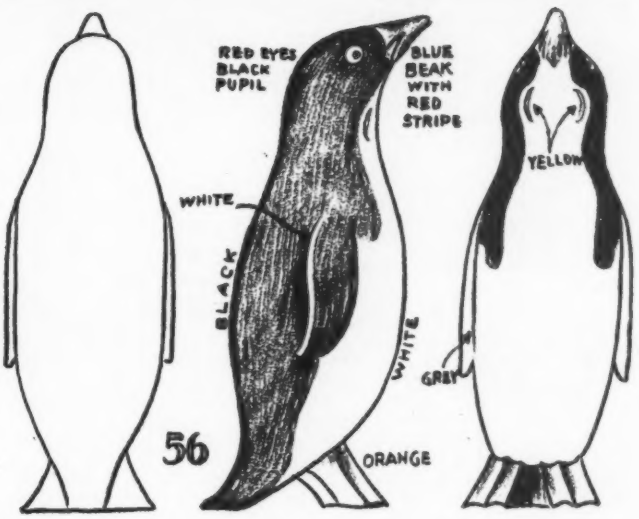
420 of the December, 1939, issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, will be found handy for removing the background.

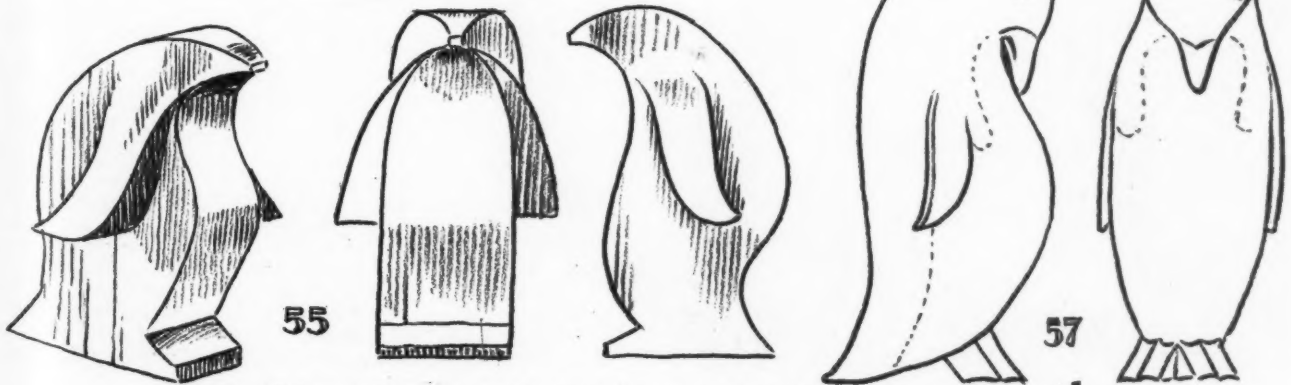
After the background is smoothed nicely, round up the body and cut the feathers as shown in Figure 48. A flock of ducks or geese in various positions can be cut out of ¼-in. bass or pine with a jig or coping saw, and whittled in relief. They can then be painted in natural colors and used for a wall decoration. In whittling in relief, be sure to cut the off-wing, that is, the one on the far side, down to about half the thickness of the near wing to give it the proper perspective. Studies of birds can be gotten from any of the many beautiful bird books on the market, or they can be obtained from the various libraries, or museums.

The funny little duck shown in Figure 52 is easy to whittle. The illustrations are shown full size. Figure 50 shows how the side view is drawn on the block and most of the wood cut away with a handsaw.

Figure 51 shows the block roughed out ready for rounding and finishing. This little fellow looks exceedingly fine after it is painted. The beak, feet, and eyes are orange, the head is green, and the band at the neck is yellow or white. Then paint the breast a buff or light brown; and the wings, back, and




NOTE: All line cuts in this article are full size so that they may be used as patterns

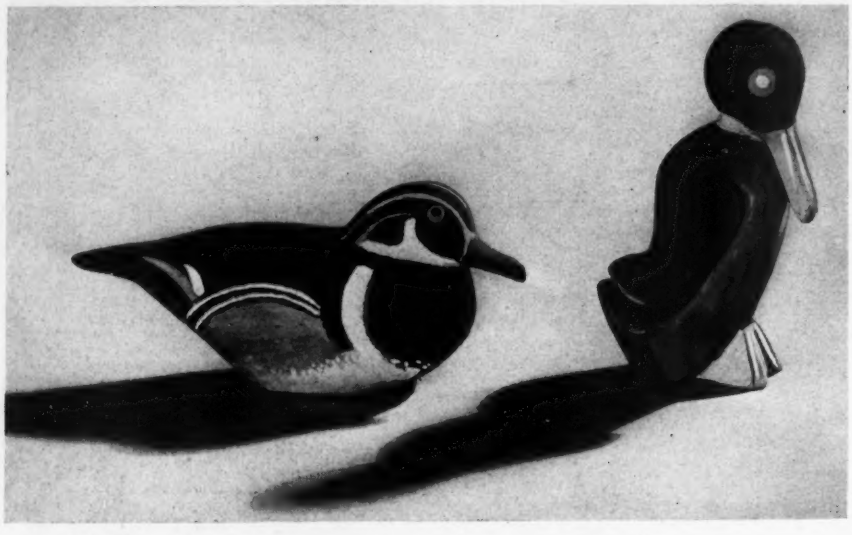
tail a dark brown. Water color gives this duck a nice soft appearance but enamels may be used if you want it to look like glazed pottery.

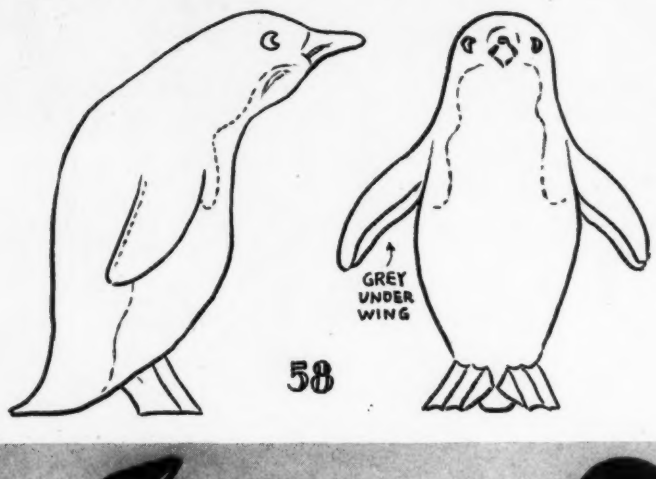
Whittling out miniature decoy ducks is lots of fun. They may be painted nicely, and if a hole is bored into the bottom and filled with lead, they make excellent paperweights. Figure 54 is a brightly colored wood duck. While the law protects this pretty bird, there will be no objection to making a paperweight decoy wood duck. The procedure is the same as that used for whittling out the funny duck. Figure 53 shows how the duck looks from above before being painted.

And now for some funny, manlike penguins. A set of them makes a nice group for a window shelf or for the whatnot. They are quite easy to whittle and to paint. Figure 55 shows how one of them looks in the blocked out stage.

Figure 56 shows the way to paint them, although the others also show a line indicating different color areas. The back is black, the breast white, the feet orange, and the beak blue, with two red streaks down the side. The eyes are red with black pupils.

Now a word about what to do when a beak or a foot splits off. All that is necessary, when such an accident occurs, is to put some glue or quick-drying cement on the split off part, and then put the same piece back in place. When thoroughly dry, finish up, and usually the break won't even show.



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## ANSWERING YOUR QUESTIONS ABOUT THE SILK-SCREEN PROCESS

*Walter A. Shuman*
**High School, Williamsport, Pa.**

School administrators, supervisors, and shop teachers have been turning an attentive ear to the subject of silk-screen process printing. Their reactions are necessarily varied. In most instances they desire to know in just what capacity it will be of benefit to them. It is hoped that the questions and answers which follow may serve in just such an informative capacity.

Q. What is silk-screen process printing?

Briefly, it is a process in which a stencil of the design to be reproduced is adhered to a silk-covered frame, through which an oil paint is squeegeed by means of a rubber blade. It is a method of duplication, giving artistic and colorful effects on any reasonably smooth surface.

Q. Would silk-screen process printing be a suitable adjunct to the typical industrial-arts shop?

Yes. Being versatile in its application, it can be used by almost any industrial-arts instructor. Paper, metal, glass, cloth, and wood, all lend themselves to this medium. Home-economics instructors likewise could profitably inquire into its utility for their purposes.

Q. Would the typical printing department profit by introducing silk-screen printing into its course of study?

The average school print shop in our secondary schools does not stress graphic arts, as such, sufficiently. Moreover, with silk-screen printing many jobs could be produced superior in appeal in every respect to prints made by the usual medium of linoleum, for instance. There are many production jobs which can be done better with a silk-screen stencil than with a power press. In view of its potential vocational possibilities, the shop instructor ought to instruct his students in the process. Printing is being successfully combined with silk screen on the same page in many instances. A noticeable enrichment of the curriculum is certain to result by its use in the school shop.

Q. Of what value is this process to the high school publication?

It is being utilized with great success in the printing of colorful magazine covers, at a fraction of the cost entailed by other processes. A three-color set of zinc plates for a school publication of the usual size will cost approximately $20 to $30; with silk-screen stencils the cost is reduced to about one tenth of that amount, with an actual increase in the beauty of the final print. For the producing of posters advertising the publication, it is unexcelled. A school publication, that the writer knows of, has produced letterheads of professional quality for its staff, using the photographic method of preparing the stencil.

Q. What are some other typical school projects that lend themselves to reproduction by this process?

Posters in several colors for athletic and social events; designs to be printed on craftwork, furniture, and fabrics; outdoor signs; rifle targets; game boards; greeting cards of all kinds.

Q. Is artistic ability a prerequisite?

Although it is an asset, it is not essential for the successful use of the process. Anyone who can trace can become a successful processor. In the larger industrial situations, an artist produces the design, the processor reproduces it. The photographic method is finding more and more use in the handling of silk-screen stencils, thus eliminating much hand work. The photographic method is commonly used to print type matter, line copy, trademarks, brush drawings, etc.

Q. Why is the process now attracting the attention of educators?

Inasmuch as there is no expensive machinery or equipment to buy, the cost factor for an ideal school activity is indeed at a minimum. The process is established as an important field of the graphic arts, with a strong appeal to homecrafters and hobbyists, giving both pleasure and profit.

Vocational educators are interested for its vocational possibilities. Private industry, advertisers, all have proved its versatility and economic advantages over other processes. Silk-screen processing, although fundamentally a hand process, is holding its own against the machine as such. The process has definite attractions for the general shop teacher, the vocational unit trade shop, the journalism club, and the art classes.

Q. What might be a minimum equipment list for an initial tryout silk-screen experience?

One drawing board (for a base), one frame with mitered corners, one rubber squeegee, two loose-pin hinges, one large spatula, one stencil knife.

Q. What supplies would be required for this equipment?

One can silk-screen poster-process paint; one sheet of Profilm, or Nufilm, or similar stencil paper; one quart of adhering liquid (for adhering the stencil to the fabric); one yard of organdy or silk; kerosine; and rags. Naturally, as one's skill increases and interest mounts, there are many accessory items to be added to this list of minimum essentials. The per pupil cost for this type of activity is obviously low in proportion to its tremendous returns.

Q. What is the most common method of making the stencil?

The knife-cut stencil, using a laminated film consisting of a patent lacquer-shellac coating on a backing sheet, is the most useful and popular. It is adhered to the silk-covered frame with a special lacquer solvent, after which the backing sheet is removed. Manufacturers will supply one large sheet of this film for two dollars, and the solvent for less than a dollar. The film is "knife traced" with a stencil knife, the areas to be printed being peeled off the backing sheet, before adhering to the silk. Naturally the area surrounding the stencil must be blocked out with lacquer, glue, or some similar substance to obviate printing through those areas.

Q. Is it possible to make a serviceable homemade stencil?

It is by many and varied methods. Many operators coat draftsman's tracing paper with orange shellac on one side, directly over a drawing. The stencil is then knife cut. After placing the covered frame on the cut stencil, with the printing (open) areas carefully removed, the whole is ironed on the organdy. The iron is applied from the inside of the frame over a piece of kraft paper. This method is not recommended for detail. It finds considerable use for poster work, signs, and the like.

Q. What are the essential operations involved in producing a typical silk-screen print?

*a*) Screen preparation is begun by covering a wood frame with organdy or process silk.

*b*) The design or art work is sketched on white Bristol board.

*c*) The stencil is knife cut, tracing with a stencil knife, on a film paper.

*d*) After having adhered the film to the silk, the backing sheet is peeled from the film sheet.

*e*) The outer edges are blocked out.

*f*) Processing is begun by placing the sheet or piece to be printed under the frame against register guides, placing a quantity of paint in one end of the frame, and squeegeeing across the stencil to force the paint through the open areas.

Q. How many copies per hour can a student print?

Approximately 300 to 400 copies can be produced in one hour, with good registration, in one color only.

Q. Is it possible to print a design on glass?

Practically any surface may be screened as, wood, glass, metal, paper, cardboard, cloth, canvas, leather, linoleum, or any reasonably smooth surface.

Q. To what extent can the photographic technique be used in silk-screen printing?

Great advances have been made in this direction. It is possible to print not only very small detail, such as type and trade-marks, but half-tone prints are being commercially processed with remarkable ease, and with equally remarkable results. So-called indirect photographic methods for preparing the stencils are now available that are reliable and stable enough for the average craftsman. The future of silk-screen processing is inextricably tied up with photography. Anyone who understands the principles of photography can learn in a very short time to make silk-screen plates by means of the photographic process, using either camera-made positives, or hand-made positives on a transparent material such as celluloid or Dul-Mat.

Q. What might be some typical school projects that would lend themselves readily to the photographic method of silk-screen plate making?

There is a vast field here, limited only by the imagination and the resourcefulness of the instructor in charge of the graphic-arts or art department. Such projects as these have been very successfully handled: greeting cards of all types; business cards; stationery, both personalized and business; bookplates; monogrammed fabrics; deluxe program covers for school functions; and the like.

Q. What is the labor market for first-class operators?

Today it is almost impossible to find an unemployed process man. Vocational schools in our cities, operating day and night classes, are placing their graduates readily. Since the method is ideal for the production of colorful advertising, the small manufacturer is eager to utilize the method. Chain stores, merchants, manufacturers, advertising agencies, showcard writers, lithographers, printers, all are using the silk-screen process. It is no longer confined to the four walls of the sign painter's studio.

It has been predicted by graphic-arts specialists that the demand will exceed the supply of processors within a few years in most of our cities.

## THE MANUAL ARTS CONFERENCE OF THE MISSISSIPPI VALLEY

Two noteworthy events occurred at the recent meeting of the Manual Arts Conference of the Mississippi Valley, namely, the resignation of Dr. William T. Bawden as chairman, and the election of Dr. Verne C. Fryklund as his successor. It is appropriate that these events be entered in the record, and it may not be amiss to set down at the same time, a bit of the history of this organization.

A large proportion of the industrial-arts teachers active in junior and senior high schools today began their careers during the past 10 or 20 years. They, therefore, have no personal recollection of a chain of significant events that took place during the early years of this century.

Charles A. Bennett

During the period from 1903 to 1912, programs for the preparation of industrial-arts teachers were established in no fewer than 13 colleges, universities, and normal schools in the seven neighboring midwestern states of Illinois, Indiana, Ohio, Iowa, Kansas, Missouri, and Wisconsin. Others followed rapidly, until now there are approximately 130 institutions of higher learning in the United States offering such work.

Ten of these teacher-training departments had been opened by the fall of 1908, one of which was at the University of Missouri, under the direction of Robert W. Selvidge, to whom belongs the credit for the original suggestion that it would be a good thing if the heads of all of these departments could get together for an informal conference on problems of common interest. In the early years, with no precedents and no experience to guide them, the directors of these new departments faced many imperative decisions, upon which the administrative heads of their institutions could offer little or no assistance.

The suggestion was acted upon by Charles A. Bennett, then head of the department at Bradley Polytechnic Institute, who called a meeting in Peoria, Ill., for November 11, 12, and 13, 1909, which was attended by 12 men. Called for the purpose of considering the specific problems of preparing teachers of manual arts (now industrial arts), it was decided after a few years' experience to limit active membership to heads of departments in teacher-training institutions, and to adopt the name, Manual Arts Conference of the Mississippi Valley. Incidentally, there has never been any effort in the direction of large numbers, because of the belief in the importance of informal, round-the-table, intensive discussion.

At each meeting seven sessions are provided for, with one major topic assigned to each session, and not more than one or two speakers to each topic, the major portion of the time being reserved for general discussion and exchange of ideas. The conference has never sought publicity, and occasionally some member has complained that "nothing is ever settled." However, it would be no exaggeration to say that through the years the participants in these discussions have sought and found the answers to many troublesome problems through the process of submitting their proposals and tentative solutions to the searching criticism of a small company of trained leaders who were, in fact, the only persons within reach who were capable of passing on the merits of many of the questions involved.

William Thomas Bawden

The editor of this magazine has been a member of the conference for many years, as a representative of the educational press, and is able to speak from firsthand knowledge of the significance of these meetings. It is not too much to say that no other single force or agency during the past 30 years has exerted a more profound influence on the progress of industrial arts in this country.

Industrial-arts teachers of the present generation, who have gone to school to the men who have made up the membership of the Manual Arts Conference, and who have become familiar with their writings in books and magazine articles, probably do not realize the significant fact that the conference, through its annual discussions and associations, was the direct inspiration for much of the literature that has been created in this field. Limitations of space do not permit elaboration of this point, but a report submitted at the 25th anniversary meeting in 1934 listed 72 authors among present and former active members, with a total of 295 titles of contributions to educational literature, including books, pamphlets, reports, special studies, but exclusive of magazine articles and editorials.

One of the noteworthy achievements of the conference was the publication of the 25th Anniversary Volume, *Industrial Arts in Modern Education,* of which Mr. Bennett was editor, and the eight chapters were contributed by eight members.

Charles A. Bennett served as chairman of the conference during the first five years, and Dr. Bawden was secretary. In 1914, after Dr. Bawden went to the U. S. Office of Education, it was voted to request the Commissioner of Education to take over the conduct of the conference. Commissioner Claxton designated Dr. Bawden to represent the Office of Education in charge of arrangements, and the latter continued in this capacity until he left the government service in 1923. At the next meeting the conference elected Dr. Bawden chairman, and he has continued in that capacity until this year, a total of 27 years.

At the 32nd meeting, held at the University of Minnesota, October 23, 24, and 25, 1941, Dr. Bawden tendered his resignation as chairman, giving as his reason a substantial increase in duties and responsibilities at Kansas State Teachers College, especially in the leadership of the Four-State Regional Conference on Industrial Arts, which meets at the college each year in October and is becoming one of the outstanding professional meetings in that territory. In requesting to be relieved of the chairmanship, Dr. Bawden expressed the keenest regret at being obliged to give up an opportunity for service which has meant so much to him, and referred to his position as chairman for 27 years as "one of the most highly prized honors of my career." He said he made a rough estimate of the hours spent in these annual "seminars" and in working on the "assignments" connected with the meetings, and declared the experience to be the equivalent of another doctor's degree in the personal benefits derived, pointing out that the men with whom he has been associating in this stimulating organization through the years are the very leaders in whose departments thousands of students have spent hundreds of thousands of dollars in fees and expenses while working for degrees.

That the members of the conference contemplated the proposed change with reluctance became evident in the comments offered, of which the following are typical:

"The fine meetings have been due largely to his initiative and interest in the cause. I hope he may be induced to reconsider and continue as chairman."

"Every member appreciates his many years of effort and unselfish service as chairman."

"I find it hard to imagine the Manual Arts Conference without Dr. Bawden presiding. He has certainly rendered a magnificent service, and we all appreciate the hours of labor he has expended for our good."

"I am sorry to see this change, for the conference will not seem the same with anyone else in that position after all these years."

"It is difficult for me to picture the conference without his capable guidance. It has required a great deal of careful planning and intensive work. Every member realizes how much of himself he put into the task."

During the discussion, Charles A. Bennett, the first chairman, recalled the early days of the conference, and referred to Dr. Bawden as one who through the years "has demonstrated outstanding qualities of leadership in conducting conferences of teachers and supervisors," and especially commended "his mastery of details, his efficient planning and direction, and yet withal his democratic and considerate methods of getting things done and of keeping speakers from wandering too far from the subject."

At the conclusion of the discussion it was voted to accept Dr. Bawden's resignation, to adopt the resolutions drafted by the committee appointed to make recommendations concerning a successor, and to approve the recommendation of the committee that Dr. Verne C. Fryklund be elected chairman, to take over the office as soon as the affairs of the 1941 meeting can be closed.

The committee consisted of Dr. Homer J. Smith, University of Minnesota, chairman; Dean Clyde A. Bowman, The Stout Institute, Menomonie, Wis.; Dean Albert F. Siepert, Bradley Polytechnic Institute, Peoria, Ill. The statement submitted by the committee, and adopted by the conference, read, in part:

*"Be it Resolved,* Therefore, that we thank him sincerely for long, arduous, and efficient assistance to us in the work of our great interest;

"That we take special note of the professional spirit, fairness, and informality that have characterized his conduct of our affairs, and that have been engendered and strengthened in us;

"That this action be made a matter of record in our minutes; and that it be transcribed, for Dr. Bawden, in a form constantly and conveniently to remind him of our pride in his accomplishments and of our gratefulness for his aid."

The incoming chairman, Dr. Fryklund, is well known professionally, and is one of the outstanding leaders in the field of teacher preparation in industrial arts and trade and industrial education. He has been an active member of the conference for nearly 20 years, having been elected while head of the department at the State Teachers College, Kearney, Neb. His selection as chairman meets the unanimous and enthusiastic approval of the members, who have pledged him their hearty support in continuing the activities of the conference.

Verne C. Fryklund is a native of Wisconsin, a graduate of The Stout Institute, Menomonie, 1916; also of Colorado State College of Education, Greeley, A.B., 1922; University of Missouri, A.M., 1927; University of Minnesota, Ph.D., 1933. He taught courses in industrial-arts shopwork and drafting in the city schools of Detroit, Mich., and Denver, Colo., also in Colorado State College of Education. He was head of the department of industrial education, State Teachers College, Kearney, Neb., 1922–30, and assistant professor of industrial education, University of Minnesota, 1930–37. From 1937 to 1941 he was head of the department of vocational education at Wayne University, and supervisor of vocational education in the city schools, Detroit, Mich. In September, 1941, he returned to the University of Minnesota. He served as guest professor in the summer sessions at Kansas State Teachers College, Pittsburg; Oregon State College, Corvallis; North Carolina State College.

Verne C. Fryklund

He enlisted in the United States Army in 1917, and saw one year of active service on the Mexican border and elsewhere. In addition to the Manual Arts Conference, he is an active member of the National Education Association; American Vocational Association; Educational Research Association; American Association of Industrial Teacher Trainers, serving as president, 1939–41; American Association for the Advancement of Science; Minnesota Academy of Science; Minnesota Education Association; Minnesota Vocational Education Association; Phi Delta Kappa; Epsilon Pi Tau. He is the author of several important contributions, the best known being *Principles of Trade and Industrial Teaching,* in which he collaborated with Professor Selvidge.

Dr. Fryklund is in every way qualified to take over the leadership of the Manual Arts Conference, and the members look forward to his administration with the greatest confidence and enthusiasm.

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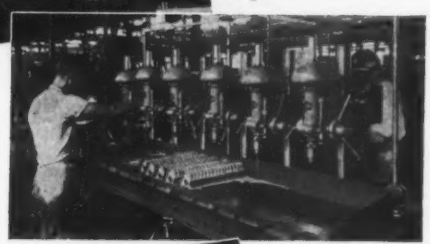

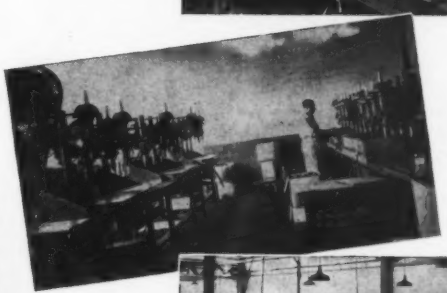

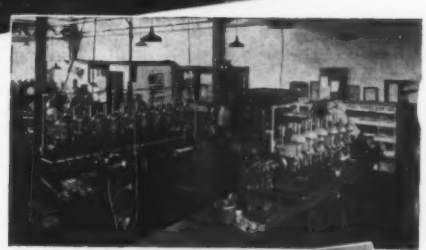

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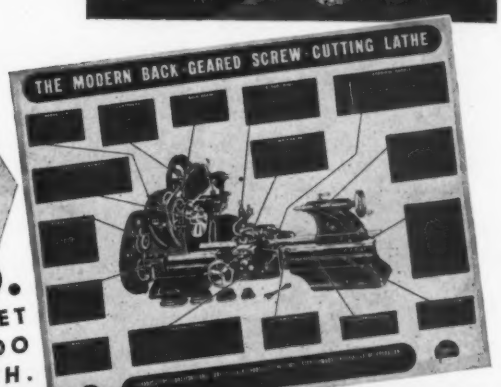


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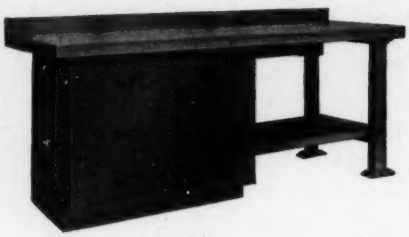

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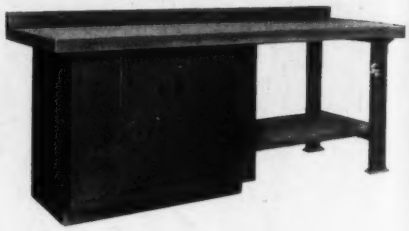

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## *Personal News*

### APPOINTED SUPERVISOR OF INDUSTRIAL ARTS

Dr. Heber A. Sotzin, formerly director, division of industrial arts, San Jose State College, San Jose, Calif., has been appointed supervisor of industrial arts, Philadelphia, Pa.

Dr. Heber A. Sotzin

Dr. Sotzin was born September 22, 1893, at Pine Grove, Pa. He graduated from the Pine Grove High School in 1910, and from the Williamson Trade School in 1914.

He received the A.B. degree from George Washington University in 1923 and the M.A. degree in 1926. In 1929, the University of Cincinnati conferred on him the Ph.D. degree.

He holds life credentials for general teaching and general school administration in the state of California.

His four years of practical experience cover wood patternmaking, drafting, and building construction. He also spent 1918–19 in the U. S. Navy.

His teaching experience follows:

Two years Indiana High Schools — Industrial Education, Natural Science, and Athletics.

Two years Erie, Pa. — Instructor of Woodwork; Manual Arts; Smith-Hughes; Vocational.

Eight years McKinley Technical High School, Washington, D. C. — Wood Patternmaking and Mechanical Drawing.

Teaching Fellowship — Part-time instructor and graduate student University of Cincinnati, 2½ years.

Instructor Summer Session — University of Cincinnati, 1928 and 1929.

Since 1929 — Professor of education and director, Division of Industrial Arts, State College, San Jose, Calif.

Since 1931 — professor of education and director, Division of Industrial Arts, State College, San Jose, Calif.

Summer Session 1932 — Assistant professor of education, Stanford University.

Summer Sessions — 1930 to 1940 — San Jose State College.

Summer Session — 1938 — University of Hawaii, professor of education.

Summer Session — 1939 and 1941 — Ohio State University, professor of education.

He has also been a consistent contributor to the literature of his profession.

He assumed his duties of supervisor of industrial arts January 1, 1942.

### GEORGE M. GAITHER RETIRES

George M. Gaither, supervisor of industrial education in the Baltimore public schools, retired from active professional service in November. He has had a remarkable career and is one of the outstanding figures in practical arts and industrial education in America. As a pioneer and aggressive leader, he, more than anyone, has been responsible for the high level of industrial-arts education in Baltimore. He has also taken a very progressive and prominent part in the development and extension of vocational and allied types of education in the city. For many years, he was a well-known member of the faculty of the Baltimore Manual Training School (now the Baltimore Polytechnic Institute).

Mr. Gaither was one of the earliest graduates of the Baltimore Manual Training School, having received his diploma from that institution in 1889. In that same year he began as a teacher in the school and continued in that capacity until 1914 when he became a full-time supervisor of manual training, including home-economics education. From 1902 to 1914 he served as part-time supervisor of the same work. His first duty early in 1900 was to assist the superintendent of schools to plan and organize shopwork for boys, and home-economics work for girls in the grade schools. In 1921 he was promoted to supervisor of industrial education. He was also instrumental in the organization of the Boys Vocational School in 1918 following the passage of the Smith-Hughes Act.

From 1911 to 1932 he conducted teacher-training courses at the Johns Hopkins University and consequently, has had much to do with the education and training of a large number of the practical arts and industrial-education teachers now in active service in Baltimore. Mr. Gaither has been a member of the teacher-training staff of the University of Maryland since 1932. He also taught classes in industrial arts in the Baltimore Teacher-Training School when it was under the direction of the department of education.

Mr. Gaither was the first president of the Maryland Vocational Education Association which was formed in 1923. He was called upon to serve again as president in 1925. He has continued to be one of its stanchest supporters, willing workers, and loyal members. In addition to his work in Maryland, he directed the summer school shop

(Continued on page 16A)

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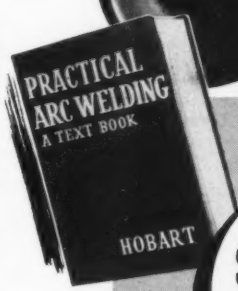


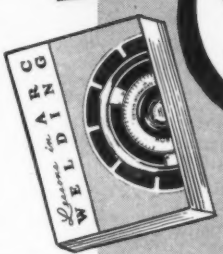


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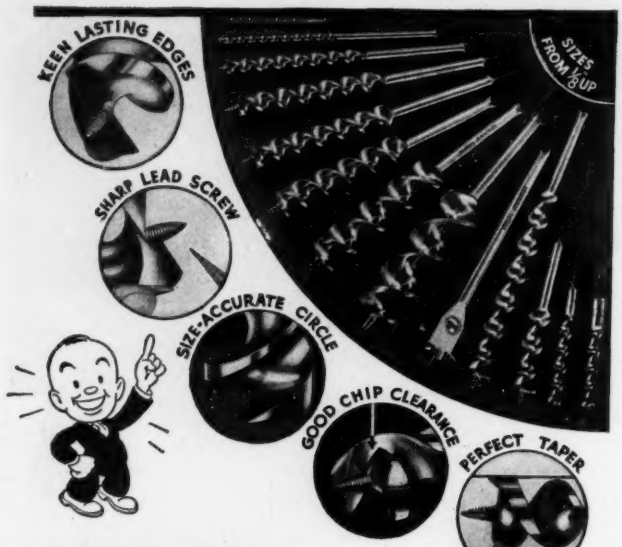


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(Continued from page 14A)

program in New York City for a few years. He has always held membership in a number of other professional organizations including the American Vocational Association and the Eastern Arts Association. There are so many other activities and achievements to his credit that space will not permit their inclusion in this statement.

♦ PAUL W. HUTH, 67, social-study teacher at the Milwaukee Vocational School for 24 years, has resigned. Mr. Huth has been teaching for 40 years.

He taught in rural schools in Sheboygan and Ozaukee Counties, Wis., was principal of the old Shorewood School for six years, taught in the Ring Street School, Milwaukee, and was county superintendent of schools for 4 years.

♦ MARK M. WALTER, director of Vocational Rehabilitation of the Pennsylvania State Department of Labor and Industry, cited the employment of 10 physically handicapped persons in the drafting rooms of the Westinghouse Transformer Division, Sharon, Pa., as typical of the success of the rehabilitation program.

♦ C. N. HIELSCHER has joined the faculty of the Department of Industrial Education, at the Agricultural and Mechanical College of Texas, College Station, Tex. He will teach elementary woodcraft, ornamental iron, and drawing, and will supervise the apprentice teachers in the Agricultural and Mechanical Consolidated High, and the Bryan Junior and Senior High Schools.

♦ DR. FRED LYMAN TIBBITTS, guidance specialist from the University of Oklahoma, was a guest professor at the summer session of the Department of Industrial Education at the Agricultural and Mechanical College of Texas.

♦ MR. FLOYD KEITH, head of general metals at The Stout Institute, Menomonie, Wis., has been given leave of absence for a period of one year to train several hundred men in the United States Navy, who in turn will then teach metalwork to those who enter the navy in the future.

A year ago most of these young people were doing work that offered little promise of advancement; others were unemployed. Then they were enrolled in special training courses in the Williamsport Vocational School of Williamsport, Pa., and today are helping to meet the nation's shortage of trained draftsmen.

The 10 students, including one girl, and seven others employed in the Philadelphia and Baltimore plants of Westinghouse, are a part of a total of 839 handicapped people in Pennsylvania who have been placed in industrial employment during the past year as a result of the rehabilitation program. Some 1000 others are now receiving training in preparation for job placement.

♦ DR. LYNN MONROE, who received his doctor's degree from the University of Missouri in 1939, is now teaching industrial arts in the State Teachers College at Santa Barbara, Calif.

♦ DR. ORVAL S. HARRISON, who completed his work for the doctor's degree at the University of Missouri in 1940, is now professor of industrial arts at Florida State College for Women, Tallahassee, Fla.

♦ ALBERT A. CARDOT, who completed his work for the master of education degree at the University of Missouri during the 1941 summer session, has recently been made local director of industrial education in Springfield, Mo.

♦ JOE BENSON, formerly instructor of industrial arts at Sedalia, Mo., has been made principal of the high school of that city. He succeeds DR. E. G. KENNEDY, now state supervisor of O.S.Y. Defense Training in Missouri. Both are graduates of the University of Missouri.

♦ FRANK DEROCKER, formerly teacher of industrial arts and co-ordinator at Helena, Ark., and a graduate of the University of Missouri, has been advanced to principalship of the high school at Brentwood, Mo.

♦ H. H. COXEN, co-ordinator and teacher trainer in trades and industries in the Kansas City, Mo., school system, has been granted leave of absence for a year. He is now working with trade teachers at the Navy Pier in Chicago.

♦ IVAN HOSTETLER, associate professor of industrial arts, South Georgia Teachers College, Statesboro, Ga., has been granted a year's leave of absence. He is serving as graduate assistant and working toward his doctor's degree at the University of Missouri.

♦ ALFRED H. MOORE, formerly instructor of industrial arts in the Senior High School of Bowling Green, Ky., is now instructor of woodwork and mechanical drawing in the high schools of Baltimore County, Md. Mr. Moore completed his master's degree at the University of Missouri during the 1941 summer session.

♦ ALVIS P. RUSHTON, formerly instructor of industrial arts in Columbus, Ga., completed his Master's degree at the University of Missouri during the past summer session, and is now instructor in machine shop and defense training in the Technical High School, Atlanta, Ga.

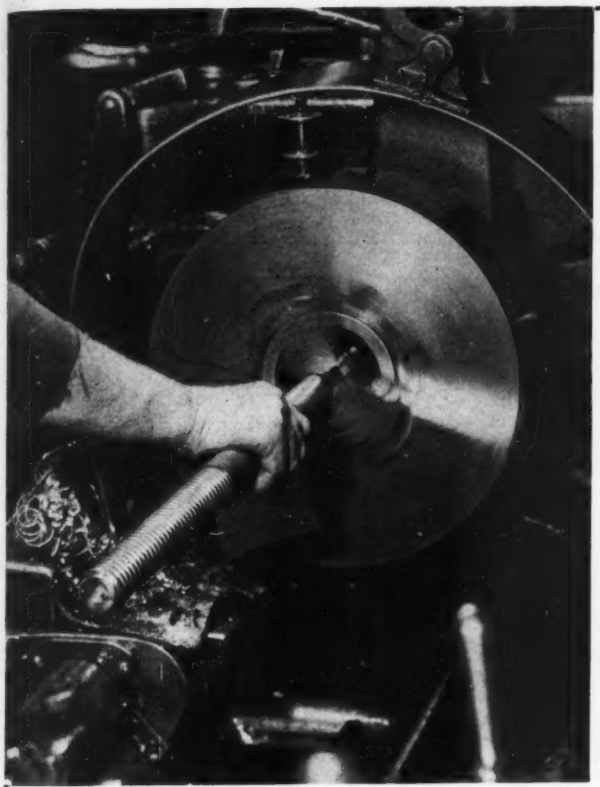
♦ RALPH A. MCKEEHAN, formerly instructor of industrial arts in the North Kansas City, Mo., public schools, has recently been made educational director in the North American Aviation Plant at Kansas City, Kans. He is a former student of the University of Missouri.

♦ EWELL W. FOWLER, formerly instructor of industrial arts in the public schools of Amarillo, Tex., is now instructor of industrial arts and supervising critic teacher in the laboratory schools at the State Teachers College, Charleston, Ill. Mr. Fowler is pursuing work toward his doctor's degree at the University of Missouri.

♦ DR. KENNETH L. BING, who received his doctor of education degree from the University of Missouri last year, has been made head of the department of industrial arts at the Southeast Missouri State Teachers College, Cape Girardeau, Mo. One feature of the reorganized program in his department will be the general shop.

♦ RAY KARNES, associate professor of industrial education, North Texas State Teachers College, Denton, Tex., has been granted leave of absence for the school year 1941–42. He is serving as

(Continued on page 19A)



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(Continued from page 16A)

graduate assistant in industrial education at the University of Missouri and completing his work for the doctor of philosophy degree in this field.

♦ HOLLIS DAHLOR, formerly co-ordinator and teacher of industrial arts at Brentwood, Mo., has been made director of defense training in the state of Missouri. During the past year he served as state supervisor in charge of this work.

♦ C. F. HAYHIE, formerly co-ordinator at Carrollton, Mo., is now serving as state supervisor of defense training with headquarters at Ft. Leonard Wood, Mo. His program involves the training of certain enlisted men in the 6th division and in the engineering training replacement center, both of which are stationed at the post.

♦ WILLIAM V. HELDRETH is teaching in the public schools of Toledo, Ohio.

♦ IRA JOHNSON has been teaching in the Roosevelt High School, Minneapolis, Minn.

♦ EDWARD R. THOMAS has accepted a new teaching position in Kenosha, Wis.

♦ F. H. THOMPSON, formerly of Newhall, Iowa, is teaching at New York University.

♦ LORING F. SNOOK is teaching at Lenoir, N. C.

♦ REUBEN GRELL is teaching at West Liberty, Iowa.

♦ WALTER HAYES has taught at Story City, Iowa, since graduation last June.

♦ MERRILL E. EDWARDS is teaching industrial arts at Perry, Iowa.

♦ F. H. HARRIS recently accepted a position in the Carver School, Hominy, Okla.

♦ KENNETH L. ORTON is in charge of automotive work in the high school at Janesville, Wis.

♦ ALLEN J. SHERMAN is directing automotive work and metalwork at Fort Madison, Iowa.

♦ PAUL NUTTING has accepted a position in the Des Moines Ordnance Plant.

♦ LELAND BENZ, of Ames, Iowa, was elected president of the Iowa Industrial Arts Association for 1941–42.

♦ JAMES H. BROLLIAR, of Fairfield, was elected vice-president of the Iowa Industrial Arts Association.

♦ CLARENCE A. BOOTMAN, of Des Moines, was elected secretary-treasurer of the Iowa Industrial Arts Association.

♦ Iowa State College, Ames, Iowa, conferred the M.S. degree upon the following: Lynn C. Adams, East Lansing, Mich.; Ralph W. E. Bowers, Ottawa, Kans.; Charles A. Burnes, Burlington, N. C.; Lawson E. Hockey, Dubuque, Iowa; Frank L. Judish, High Point, N. C.; Ray F. Kranzusch, Menomonie, Wis.; Ellsworth M. Russell, Decatur, Ill.; Forrest D. Sissell, Muscatine, Iowa; Loring F. Snook, Ames, Iowa; Leonard A. Stone, Mesa, Ariz.; Kauko A. Wahtera, Battle Creek, Mich.; Cecil Wriedt, Cedar Falls, Iowa.

♦ LAWSON E. HOCKEY is teaching metalwork in the public schools, Dubuque, Iowa.

♦ ROBERT BUEL took Mr. Hockey's place at Fort Dodge, Iowa.

♦ LLOYD SEAVERS is teaching in the high school at Charles City, Iowa.

♦ T. S. CARTY is teaching in the West Des Moines public schools.

♦ H. PAUL SWEANEY has been appointed to the teacher-training faculty of the Michigan State College at East Lansing, Mich., to fill the position left vacant by G. C. Cook during the latter's leave of absence.

♦ D. V. DURYEE has been appointed head of the machine-shop department of the Wilbur Wright Vocational School, Detroit, Mich.

♦ KENNETH MUSSON, co-ordinator, Manistique, Mich., has been transferred to Petoskey, Mich., as co-ordinator.

♦ B. C. AUSTIN, co-ordinator at Newberry, Mich., has been transferred to Manistique, Mich., to fill the vacancy left by Kenneth Musson's transfer to Petoskey.

♦ EARL SCHURR has been appointed co-ordinator at Northville, Mich., for the cooperative training courses in retailing and office practice.

♦ E. V. ELLISON, co-ordinator at Northville, Mich., has been made area co-ordinator for South Lake High School, St. Clair Shores and East Detroit, Mich.

♦ FRANKLIN RYAN has been appointed co-ordinator of the cooperation training programs in retailing and office practice at Farmington, Mich.

♦ G. C. COOK, teacher trainer of agricultural education at Michigan State College, East Lansing, Mich., has been granted leave of absence to assist at the U. S. Office of Education with the national defense training program.

♦ Joseph Norris Galley, member of the faculty of The Ottmar Mergenthaler School of Printing, Baltimore, Md., received the B.S. in education degree at the Richie Coliseum, University of Maryland, College Park, Md., last summer.

♦ WILLIAM W. RITTER, instructor of industrial arts in the Kansas State Boys Industrial School for the past four years, and lately foreman of the woodwork department of the NYA school, Wichita, Kans., has accepted a position as junior instructor in the Naval Aviation School, Chicago, Ill.

♦ PALMER O. BREKKE and ROBERT F. BUNKER, both alumni of The Stout Institute, Menomonie, Wis., are teaching industrial arts in the schools of Salisbury, N. C.

♦ BENJAMIN FOX, administrative assistant at the Brooklyn High School for Specialty Trades, has been appointed principal of the Samuel Gompers Vocational High School, the Bronx.

♦ KARL LOHR, a graduate of The Stout Institute, Menomonie, Wis., is teaching printing at Slocum High School, Trenton, Mich.

♦ WILLIAM HANSEN, an alumnus of The Stout Institute, Menomonie, Wis., has returned from service in the coast artillery at San Diego. He will resume his teaching at Willmar, Minn.

♦ EARALD BARTON has been appointed to the position of supervisor for defense classes at Glendale, Calif.

(Continued on next page)

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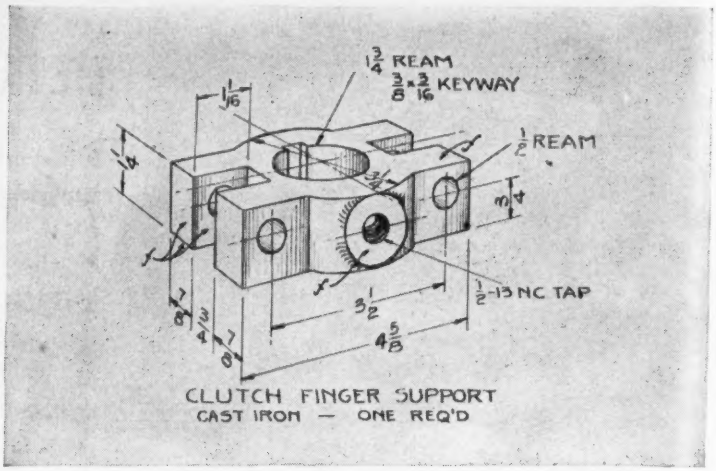


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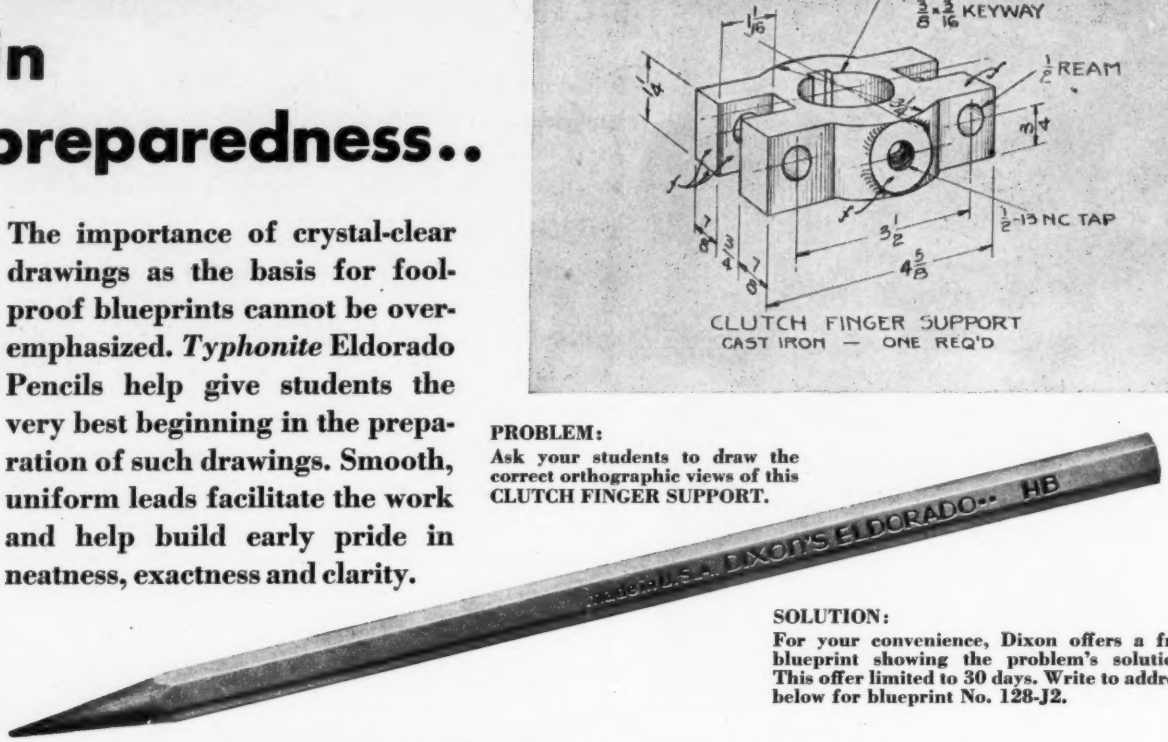


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(Continued from previous page)

♦ MELVIN SCHLOSSMAN, teacher of general metalwork in the high school, Annapolis, Md., received his master's degree during the summer session at the Agricultural and Mechanical College of Texas, College Station, Tex.

## News Notes

♦ Eight seniors from the electrical department of Boys' Trade and Technical High School, Milwaukee, Wis., have entered into an agreement with the Cutler-Hammer Co., which allows them to divide their time between school and work until their graduation on January 30.

The students will be at school from 8:30 a.m., to 3:10 p.m., and then work at the Cutler-Hammer plant from 4 to 10 p.m. This plan was worked out by Principal Thomas G. Brown, and Vice-Principal Fred W. Ziegenhagen.

♦ Recipients of the arc-welding scholarships in welding engineering established at the Ohio State University in 1939 are announced by Charles E. MacQuigg, dean of the University's College of Engineering, Columbus, Ohio.

Recipients of the 1941–42 scholarships are William S. Wagner, a junior of Navarre, Ohio, and Robert Frederick Bluhm, a senior of Scottsdale, Pa.

The arc-welding scholarships, made possible by an anonymous donor, amount to $250 each and may be awarded annually to one junior and one senior student in the curriculum in welding engineering. Award of the scholarships is on the basis of: (*a*) scholastic record; (*b*) personality; (*c*) character; (*d*) leadership and participation in academic activities; (*e*) enthusiasm for and promise in welding engineering.

The scholarships are available to juniors and seniors pursuing the curriculum of welding engineering. Appointments are for one year only but there is no restriction on a candidate receiving an appointment as a senior even though he may previously have held a scholarship as a junior.

The funds, originally deposited with the board of trustees of the university, provide for two scholarships per year for a period of 10 years.

♦ The Douglas Fir Plywood Association informs us that 233,000 sq. ft. of plywood has been ordered to mask bomber plants on the Pacific coast during blackouts.

This adds another role to the many which plywood is already playing in the defense of the nation.

♦ Under the direction of Dr. Hippaka, with E. H. Christiansen of Cedar Rapids as cochairman, and the help of 60 most cooperative shop teachers of the state, the 80-page *Iowa Industrial Arts Handbook* was completed and distributed during the State Convention in Des Moines. Faculty and students were among the contributors. Professor Carver's contributions were especially significant.

♦ Boston University has advanced the date of its 1942 Commencement from June 8 to May 25 and is completing arrangements to offer a 12-week summer period of study to enable high school graduates to finish their college studies in three years.

♦ The whole field of weights and measures administration and suggestions for the improvement and extension of this service for the protection of the public are covered in a new handbook just released by the National Bureau of Standards, Department of Commerce.

♦ Students, recent graduates, and others who think they would like to go into business for themselves, instead of working for an employer all their lives, will find the advantages and disadvantages of doing so succinctly described in *Starting Your Own Business*. This is the latest leaflet in the series of 67 Occupational Abstracts published at New York University by Occupational Index, Inc.

♦ *66 Best Books on Occupational Information and Guidance,* is a bibliography arranged in suggested order of purchase for an average public school library. The authors are Professor Robert Hoppock of New York University and Samuel Spiegler, managing editor of *Occupational Index,* published by Occupational Index, Inc., at New York University.

## Association News

### A.V.A. CONVENTION

The thirty-fifth annual convention of the American Vocational Association held at Boston, Mass., December 10–13, 1941, may be said to have been successful in every way. Opening, as it did, right after the dastardly attack of the Japanese upon Pearl Harbor, gave a very real meaning to the discussions centered about the general theme, "Vocational Education — National Defense (which quickly was changed into Victory Defense) — and Economic Security."

Philip J. Spang of the Boston Trade School, president of the Massachusetts Vocational Association, and chairman of the local convention committee, together with his local workers and L. R. Humpherys, president of the A.V.A., deserve great commendation for the smoothness with which all programs could be presented and carried to a successful conclusion.

The opening session on Wednesday, December 10, at 8 p.m., in the Hotel Statler, was presided over by L. R. Humpherys, president, American Vocational Association, Inc.; Department of Agricultural Education, Utah State Agricultural College, Logan, Utah.

"The Star-Spangled Banner," and other beautiful numbers rendered by the Girls High School Glee Club, of Boston, directed by Joseph H.

(Continued on page 23A)

(Continued from page 20A)

Gildea, assistant director of music, Boston public schools, gave an enjoyable setting for the speeches which followed.

The speakers emphasized that modern education must provide more occupational experiences, and more understanding of economic and vocational relationships and responsibilities.

The speakers on this keynote program were: Dr. Walter F. Downey, Commissioner of Education, Commonwealth of Massachusetts; Dr. Kenneth C. Ray, Director of Education, State Department of Education, Columbus, Ohio; and Oscar W. Rosenthal, president, The Builders' Association, Chicago, Ill.

The annual banquet on Thursday evening showed a record-making attendance. The invocation was given by The Right Reverend Monsignor Richard J. Quinlan, diocesan director of parochial schools, Boston, Mass., L. R. Humpherys presided, and John W. Studebaker, United States Commissioner of Education, U. S. Office of Education, Washington, D. C., was the toastmaster.

The beautiful music was furnished by the Boston University Choral Art Society, conducted by H. Augustine Smith and the associate conductor, Simon Gesin.

The speakers, The Honorable Paul V. McNutt, Federal Security Administrator, and director, Defense Health and Welfare Services, Washington, D. C.; and The Honorable Josh Lee, United States Senator from Oklahoma, both emphasized the need of a thoroughly unified, country-wide system of vocational education which gives every one interested a chance to prepare himself for a future in which America must take a greater part in world affairs.

The first session held by the industrial-arts section was under the chairmanship of Richard M. Savage, director, industrial arts department, Gorham Normal School, Gorham, Me., and state supervisor of industrial arts.

At this meeting Frank C. Moore, director of industrial arts, board of education, Cleveland, Ohio, spoke on "Trends," and described the newer type of purposeful activity which would call forth the interest of the future pupil in the elementary school.

He also described that the work on the secondary education level would put more emphasis on independent student planning and less on theory and on assignment of definite jobs and projects.

Willis A. Whitehead, professor of industrial-arts education, State Teachers College, Fitchburg, Mass., gave an excellent talk on the subject of "Preparing the Shop." He stated that planning for any educational program requires an understanding of the philosophy of the specific field for which the program is intended. He also pointed out that such elements as community data, research studies of building, and physical requirements must be made.

Augustus F. Rose, director of manual arts, board of education, Providence, R. I., was the chairman of the Friday morning session.

Louis V. Newkirk, director of industrial arts, board of education, Chicago, Ill., gave an illustrated lecture on the setup of the elementary grades in the Chicago system.

Earl L. Bedell, director of vocational education, board of education, Detroit, Mich., chose the "Junior High School Years" as the subject for his presentation.

Raymond W. Phipps, chairman, division of industrial arts and vocational industrial education, Teachers College of Connecticut, New Britain, Conn., and state supervisor of arts and industries, was the chairman at the Friday afternoon session.

Ralph E. Pickett, associate dean, school of education, New York University, New York, N. Y., read an excellent paper on the "Increasing Responsibilities in the Senior School." Lawrence F. Ashley, chief, division of vocational education, board of education, Yonkers, N. Y., discussed the "Inter-Relationships of Industrial Arts and Vocational Training." The discussion was lead by John J. Metz, editor, INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, The Bruce Publishing Co., Milwaukee, Wis.

The Saturday morning session was under the chairmanship of Willis B. Anthony, director, industrial-arts department, State Teachers College, Fitchburg, Mass.

At this session William J. Micheels, instructor in industrial education, University of Minnesota, Minneapolis, Minn., discussed the subject of "Contributions to Guidance through Industrial Arts."

Arthur B. Mays, professor of industrial education, University of Illinois, Urbana, Ill., spoke on "Versatility and Other Youth-Serving Goals in Industrial Arts."

S. L. Coover, director, department of industrial arts, State Teachers College, California, Pa., gave a demonstration on the use of a measuring device which he has perfected for use in mechanical ability tests.

The chairman at the Industrial-Arts Luncheon on Saturday was Edward C. Emerson, associate director of manual arts, school committee, Boston, Mass.

Norman D. Anderson, supervising principal, vocational center schools, Chicago, Ill., acted as toastmaster.

The speakers on this occasion were Arthur L. Gould, superintendent of schools, Boston, Mass., and William H. Johnson, superintendent of schools, Chicago, Ill., and the subjects were "Early Development of Pre-Vocational Education," and "Preparatory Vocational Education and Training as an Essential Part of the Industrial Arts-Vocational Education Program," respectively.

*(To be continued)*

## AMERICAN INDUSTRIAL-ARTS ASSOCIATION

Two unusually significant conferences on industrial-arts education have been planned by the American Industrial-Arts Association, to be held

(Continued on next page)

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(Continued from previous page)

during the American Association of School Administrators convention in San Francisco, Calif., on Monday and Tuesday, February 23 and 24.

The first session will be devoted to "Leadership Problems in Industrial Arts Education: Research, Administrative, Associational, and the Example of a Federal Program." Professor Marion T. Weatherford of the State College at San Jose, Calif., will preside, and the discussion will be by Dr. Edwin A. Lee, dean of education, University of California at Los Angeles; Dr. Lynn C. Monroe, professor of industrial-arts education in the State College at Santa Barbara, Calif.; Dr. Louis V. Newkirk, president of the American Industrial Arts Association and director of industrial arts, Chicago public schools; Mr. R. L. Schwanzle, regional director of shopwork, National Youth Administration, Denver, Colo. The summary and implications of the conference will be given by Dr. A. D. Graves, deputy superintendent of schools, San Francisco.

The second session will be devoted to "Industrial-Arts Curriculum Problems: Elementary and Secondary Levels." Mr. A. R. Nichols, principal of the Technical High School, San Jose, Calif., will preside. Dr. Louis V. Newkirk of Chicago will make the keynote address. This will be followed by a panel discussion including the following speakers: Mr. Will Matthews, director of industrial arts, Oakland, Calif., public schools; Professor Russell B. Kidder, director, department of industrial-arts education, State College, Chico, Calif.; Mr. Warren P. Dayton, director of industrial arts, Sacramento, Calif., public schools; and Mr. O. B. Badger, director of industrial arts, Portland, Ore., public schools. The summary and implications of the conference will be given by Dr. George C. Jensen, assistant superintendent of schools, Sacramento, Calif.

♦ Rho Chapter of Epsilon Pi Tau in the State College at San Jose, Calif., is sponsoring a fellowship banquet for members and friends of the fraternity during meetings of the American Association of School Administrators in San Francisco, Calif., on Saturday, February 21, 1942, at the St. Francis Hotel.

Mr. Robert J. Stoffer, principal of the Continuation School in San Francisco, is to preside, and the speaker will be Dr. Benjamin E. Mallary, professor of education, University of California, Berkeley. His address is to be on "The Guidance Values of the Industrial-Arts Program." The public is invited, and anyone near at hand should not miss the very real privilege of participating in another one of Epsilon Pi Tau's outstanding affairs.

The fraternity will maintain a headquarters in the St. Francis Hotel, where there will be a reception in honor of the speaker and officers of the fraternity following the banquet.

♦ An Epsilon Pi Tau Regional Meeting was held on November 1, 1941, at Ball State Teachers College, Muncie, Ind.

The program started with a visit to the Ball Brothers Mfg. Co. at 9:30 in the morning. This was followed by a luncheon at 12, and by visits to the Burris Arts Work Shop and the art gallery.

The examination of the candidates started at 3 p.m., and the initiation was held at 5.

The initiates were: Ralph E. Curie, Forest Swank, and Herbert G. Vincent — Alpha Chapter; Robert McGinnis, Homer Carl, F. Lee Bushong, Charles Meyer, Fenton E. West — Beta Chapter; Walter D. Ernsting, Robert M. Smith, Edward J. Kornman, Robert L. Littleton, and William T. Sheffield — Gamma Chapter; Edward Gebhardt, Everett Lutyens, John Oklepek, Frank Kranic, Richard Martikonis, Glenn Romke, and Charles Strejc — Zeta Chapter; Thomas Dean — Eta Chapter; Robert A. Carrell, Herschel L. Collins, Richard P. Frommel, Gerald Langford, Edward T. Day, and James W. Smith — Iota Chapter; Thomas E. Eachus and Lawrence Nichols — Lambda Chapter; Richard Egloff and Edward Paloncy — Mu Chapter; Raymond L. Berry, Glenn W. Tjepkes, Iver L. Bidne, and George Loebl — Pi Chapter; Uda H. Koerner, Paul McCurry, Don J. Blyth, John P. Harbaugh, Ted Hunter, Fred O. Anderson, LeRoy A. Carbonneau, John E. Roberts, and John P. Wantuch — Chi Chapter.

The initiation team was composed of the following: Honorable Basileus, William Ashley, Des Plaines, Ill.; Historiographos, Glenn E. Best, Montgomery, W. Va.; Texnikh, J. K. Vandam, Bakersfield, Calif.; Pragmateia, J. B. Petta, Fort Worth, Tex.; Exetasis, Harold G. Palmer, Cedar Falls, Iowa; Hegemon, Kenneth Phillips, Buffalo, N. Y.; Phylax, Wayne P. Hughes, Charleston, Ill.; Faculty Sponsor, W. E. Warner, Columbus, Ohio.

At the banquet which followed, Doyle Collier, president of Beta Chapter, was chairman, and Dr. Ralph Noyer, dean, Ball State Teachers College, was toastmaster.

The speakers were: Dr. L. A. Pittinger, president, Ball State Teachers College; Dr. Louis V. Newkirk, director of industrial-arts education, Chicago public schools; Professor O. E. Sink, Ball State Teachers College; Dr. Fred J. Schmidt, Ball State Teachers College; Dr. Boyd H. Bode, Ohio State University; and Dr. W. E. Warner, Ohio State University.

♦ The Council of Guidance and Personnel Association will hold its convention on February 17–20 at the Fairmont Hotel, San Francisco, Calif. The secretary of this association is Robert F. Moore, Columbia University, New York City.

♦ The National Vocational Guidance Association will hold its convention at the Fairmont and the Mark Hopkins Hotels, San Francisco, Calif., on February 18, 19, and 20. For further information, address the secretary, Dr. Clarence W. Failer, 425 W. 123 St., New York City.

♦ The Illinois Vocational Association will hold its convention at the Morrison Hotel, Chicago, Ill., on March 26, 27, and 28.

♦ The November meeting of the School Crafts Club of New York City was one of outstanding interest to those present. Rudolph Schumacher, Jr., of Haaren High School, assisted by Mr. Carl Ufer of the William Dixon Co., held the spotlight for most of the evening with a talk

(Continued on page 27A)

# *Giving New Zest to Electrical Training*

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(Continued from page 24A)

on "Applied Design for Jewelry and Art Metal." An interesting demonstration coupled with an understanding display of art-metal projects left us all with something to think about and much to profit by. Such excellent craftsmanship is surely an inspiration to both young and veteran teachers.

The next meeting will be held on January 17, 1942, at the Hotel Imperial, Broadway and 32nd Street, New York City, at which time the program chairman promises the members another pleasant and profitable evening.

*—John M. Matheson*

♦ The 1942 conference of the School of Business of the University of Chicago will be held on Friday and Saturday, June 26 and 27, in Haskell Hall, on the University of Chicago Quadrangles. It will consist of an invitational session at which will be discussed criteria for the establishment of standards in both basic and vocational subjects, and plans for the improvement of existing standards; and a public session devoted to a discussion of standards as related to the classroom teacher, the administrator, the learner, and the parent.

*—Frank A. Mancina*

♦ The West Virginia Industrial-Arts Association held a sectional meeting on October 31, at the Stonewall Jackson High School, Charleston, W. Va.

Dan W. Cline, branch manager of the Sherwin-Williams Co., at Charleston, furnished two experts from his sales division to give the members of the association a practical demonstration of the silk-screen process.

This association will hold its next conference at West Virginia Institute of Technology, Montgomery, W. Va., on April 18, 1942.

The officers of the West Virginia Industrial-Arts Association are: Philip B. Stealey, president; Glenn E. Best, secretary-treasurer; and Fred W. Eberle, editor of the *Industrial Arts Newsette*.

♦ The Mu Sigma Pi Fraternity of Wayne University held its annual initiation and banquet at the University Club, 1411 East Jefferson Ave., Detroit.

Delmar Pardonnet, teacher, Hutchins Intermediate School, Detroit, was general chairman of the occasion, and Dr. George Myers, professor of vocational education, University of Michigan, was the toastmaster at the banquet.

George Fern, director of the State Board of Control for Vocational Education, was the main speaker of the evening.

Dr. John H. Trybom, director emeritus of vocational education, Detroit public schools, and Dr. Earl C. Kelley, associate professor of secondary education, Wayne University, were guests of honor.

The present officers are: president, G. Harold Silvius; vice-president, Ernest G. Gardner; recording secretary, Frank C. Gordon; corresponding secretary, A. G. Whitney; treasurer, Frank Updegraff.

♦ The Western Arts Association will hold its 1942 convention at Kansas City, Mo., April 8–11, 1942.

(Continued on page 30A)

**Mu Sigma Pi Honorary Graduate Industrial Education Fraternity**

**Standing, left to right: Clyde Skinner, Marshall Byrn, Leroy Charlick, Julius Nelson, Carl Turnquist, Edwin Rowley, William Jumer**

**Seated: Dean Cook, Hartley Schaal, G. Manson Taylor, Frank Riess, Theodore Hoover**

# Shop Equipment News

## New Products — Publications

### TYPE G-4 PORTER-CABLE BELT GRINDER

As a new addition to their line of Wet and Dry Abrasive Belt Grinders, the Porter-Cable Machine Co. of Syracuse, N. Y., announces a small abrasive belt sander-grinder using a belt 4 in. wide by 45 in. in circumference. This grinder is so equipped that it may be used either with dry belts or with the new type, resin-bonded abrasive belts on which water or other coolant is sprayed. A ¾ h.p., 1725 r.p.m. ball bearing, totally enclosed motor, directly connected to the

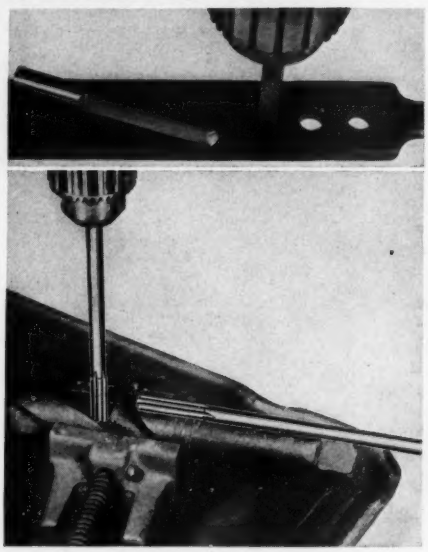
drive pulley of grinder, gives a belt speed of 3400 f.p.m., traveling over a 4 by 10-in. flat backing plate, allowing a working surface of 40 sq. in. Two convenient hand adjustments simplify the application, removal, and alignment of abrasive belts. A removable side guard exposes the entire interior. The cast-iron pedestal on which the complete unit is mounted is substantial yet light enough to make the machine readily portable. A position change from vertical to horizontal, or even horizontal with the belt underneath can be quickly made by removing three bolts. The slotted rest table is adjustable up to a 45-deg. angle.

The Type G-4 is recommended for sanding or grinding small parts composed of wood, metals, plastics, glass, fiber, hard rubber, ceramics, and other materials where a clean, uniform surface is desired. It will also handle many light milling and grinding operations without the use of fixtures.

### HARDSTEEL DRILLS AND REAMERS

A new type of reamer, made of Hardsteel and capable of reaming hardened steel of any degree of hardness without annealing, has been developed by the Black Drill Co., 5005 Euclid Ave., Cleveland, Ohio.

The new reamer, made of the same secret-process metal which is used in Hardsteel drills, is designed to operate in the same manner as the drills and will easily outlast any high-speed reamer now in use. While the ordinary high-speed reamer will ream metals up to 35 deg. Rockwell, Hardsteel reamers will ream metal of any hardness up to and including nitrided surfaces. No other reamer has ever performed this task, and the remarkable fact is, that Hardsteel reamers will work in hardened steel of *any* hardness without unusual wear.



Hardsteel drill and reamer operating in hardened steel. — Black Drill Co.

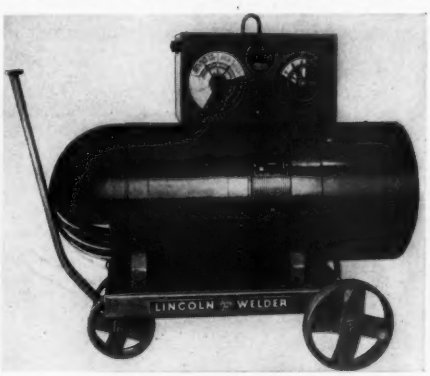
They have been used successfully on carburized, oil-hardened, water-hardened, cyanided and nitrided pieces of high carbon, high-speed steel, manganese steel, and high chrome steel.

In addition, Hardsteel reamers will ream cored holes in chilled castings with much higher tool life than high-speed reamers.

### IMPROVED LINCOLN ARC-WELDER CONTROL

Improved and simplified design of its exclusive system of "Dual Continuous Control" for arc-welding machines, is announced by the Lincoln Electric Co., 12818 Coit Road, Cleveland, Ohio.

These welders have job-selector and current-control dials which indicate the type of work and




Courtesy, The Lincoln Electric Co., Cleveland, Ohio

the number of amperes for each and every setting. It is claimed that this feature enables the welding operator to secure highest quality welds and highest possible welding speeds.

Another feature of this welder control is that both voltage control (job selector) and current control are continuous in operation, and either or both can be advanced or retarded in increments as fine as desired.

An important advantage made available by this design development is the ability to positively reverse polarity.

Advantages of the new development may be summarized as follows: (1) ability to set and read the current from the dial; (2) elimination of trouble and expense resulting from meter breakage; (3) elimination of meter inaccuracy after a few months' use in service in the field; (4) availability of positive polarity reversal; and (5) ability to quickly verify polarity by noting position of switch handle.

### ADDITION TO BEHR-MANNING PLANT

During recent weeks, Behr-Manning of Troy, N. Y., have completed a further extension to their Coated Abrasive plant. This extension is a one-story, monitor-type building almost identical in design with a similar building completed about two years ago. It is approximately 135 by 400

ft., and adds 54,000 sq. ft. to the manufacturing area. About one half of this area will be devoted to a new coating unit and drying rooms embracing all modern techniques and developments for the making of industrial coated abrasives. The remainder of the building will supply storage for much of the materials required in the operation of the new unit.

### NEW DESCRIPTIVE CATALOG

The Simmons Machine Tool Corp., North Broadway, Albany, N. Y., have just issued a 58-page catalog describing the Simmons way of reconditioning and rebuilding machine tools.

Starting in 1910 with two employees working in a small store, this firm has grown continually until today its plant occupies two modern buildings embracing 120,000 sq. ft. of space in which 350 people are employed.

In its storage rooms, available for immediate delivery, are rebuilt machines of many kinds and sizes, all of which are accompanied by a stringent satisfaction-guaranteed sales clause.

In the catalog just issued, both the method of doing the work and the finished product is described.

### THE 3 R'S BOOKLET

E. C. Atkins and Co., 402 South Illinois St., Indianapolis, Ind., have just issued to their employees, old and new, a small paper-bound booklet entitled "3 R's" (read, remember, resolve), in which safety, cleanliness, the rules of the shop, employee identification, reporting absences, the need for vigilance against espionage and sabotage, and the like, are briefly but pungently explained.

The back cover contains "The American's Creed" and the pledge to the flag.

### DOALL ATTACHMENTS

Continental Machines, 1301 Washington Ave. South, Minneapolis, Minn., manufacturers of the Doall Contour Machine, have just issued a folder in which the attachments now available are described and illustrated. Among these attachments are the following:

An illuminating magnifying glass which illuminates and enlarges the layout line so that much close work is possible. The cutoff and mitering attachment permits accurate gauging of length,

(Continued on page 30A)

# VERNON SHAPERS GIVE YOU *Most* CAPACITY *Greatest* RIGIDITY per dollar invested

**Engineered to meet tool room and industrial demands for high precision and production. Exceptionally smooth in operation due to helical cut bull gear and pinion, accurate, careful machining, and rigid construction.**

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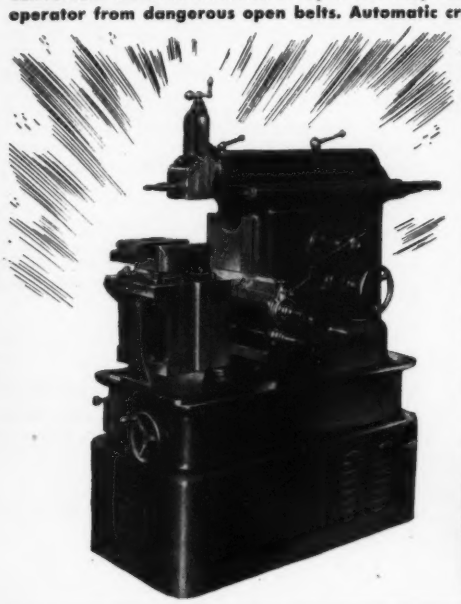

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Recommended for precision tool room or general industrial production. Massive, heavily ribbed construction throughout assures absolute rigidity.

**Back-Geared Drive** guarantees maximum power on heavy cuts. Helical type bull gear is adjustable for tooth wear and is mounted in Timken tapered roller bearings.

SPECIFICATIONS

| | |
|---|---|
| Strokes per minute | 15 to 170 |
| Table size ... Top | 10"x12" |
| Depth | 10" |
| Approximate weight | 1200 lbs. |
| Motor | 1 H.P. |

## Vernon 11" Precision Shaper

**Popular priced shaper** for high speed, precision work. Handles all jobs within its capacity as efficiently but much faster than larger, more expensive machines.

SPECIFICATIONS

| | |
|---|---|
| Strokes per minute | 50 to 150 |
| Table size ... Top | 7"x9¼" |
| Depth | 7¼" |
| Approximate weight | 800 lbs. |
| Motor | ¾ H.P. |

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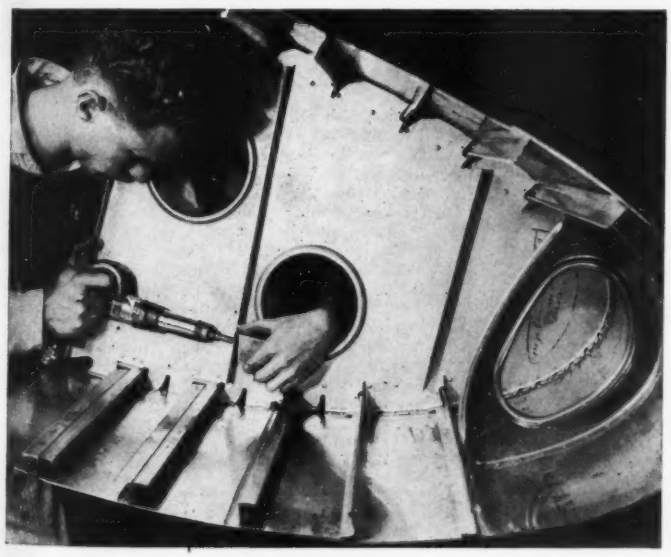

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**The Textbook was prepared with the full co-operation of Douglas, Stinson, Luscombe, and Lockheed aircraft organizations, the Aluminum Company of America, Engineering and Research Corporation, L. S. Starrett, and the leading tool manufacturers of the United States, who provided photographs, statistics, and other specialized information on up-to-date materials and methods. It covers all essentials of modern sheet metalwork, with emphasis on aluminum and other aircraft specialties. Bound in military-tan-and-blue cloth, meeting the highest standards for textbook manufacturing, this brilliant new text meets the special problems of sheet-metal instruction, 1942 model.**

### PART II. THE WORKBOOK

**The Workbook contains 27 aircraft sheet-metal problems in blueprint form, organized to dovetail with the unit-type information of the text. Special comments, references to textbook units, and ruled spaces for listing tools and materials and other information appear on a page facing each blueprint. Large size, paperbound.**

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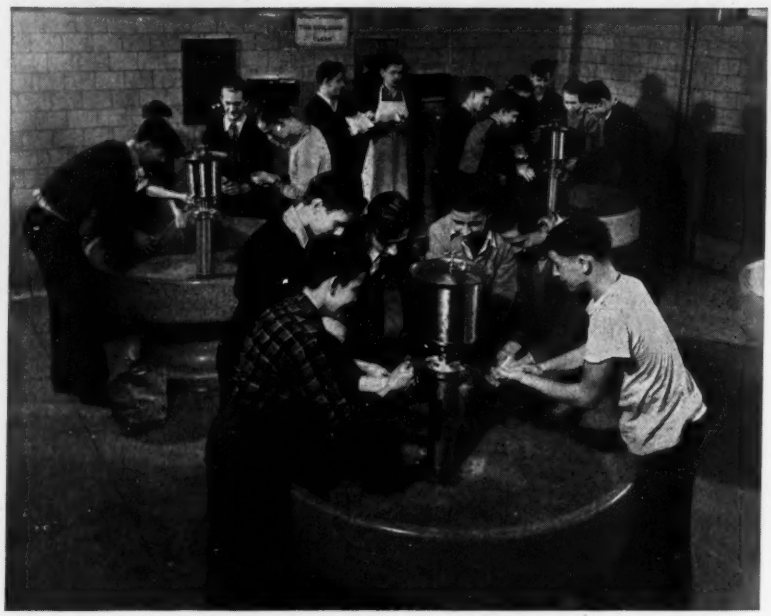

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and cuts to any angle. Then there are attachments for cutting, ripping, band polishing, and grinding, etching, pencil, saw guides of various kinds, hydraulic-control contour feed and heavy work clamps, heavy work slide, filing and beveling, saw lubricator, and auxiliary worktables.

Descriptive materials can be obtained on all of these attachments by writing for the Doall attachments folder.

### NEW SUPPLY CATALOG

The Universal Handicrafts Service, 1267 Sixth Ave., has issued a new 1942 supply catalog of 200 pages, spiral wire-bound and profusely illustrated, which lists thousands of tools and materials required for industrial-arts and activity programs for all grades from kindergarten up.

Notwithstanding priorities and other supply problems, substitutes are being worked out to meet school needs including reduced budgets. The catalog lists materials ready for immediate shipment.

The following are major divisions of the catalog: leathercraft, metalcraft, basketry, block printing, plastics, knotting and braiding, etching, beadcraft, woodcraft, painting, nonfired clays, weaving, books, and instruction manuals.

A new series of instruction sheets, devoted to the use of odd and discarded materials, are being prepared. These will be issued monthly at a nominal subscription price.

## ASSOCIATION NEWS

(Continued from page 27A)

"Art in the America of Tomorrow" has been chosen as the theme for the convention.

Among the speakers who will appear on the convention program are the following: Faber Birren, color engineer and member of the faculty of Pratt Institute of Fine and Applied Arts, Brooklyn, N. Y.; Allen Eaton, of the Russell Sage Foundation, New York City; Gladys Miller, decorating editor with Mademoiselle Magazine, instructor at New York University, and style consultant in the furniture and allied fields; Ralph M. Pearson, artist, educator, and organizer and director of the Design Workshop, Nyack, N. Y.; and Worth Ryder, muralist, lecturer and professor of art, University of California, Berkeley, Calif.

The president of the Western Arts Association is Raymond E. Cote, Chairman of the Art Department, Boy's Technical High School, Milwaukee, Wis.; and the secretary, Joseph K. Boltz, Franklin, Mich.

The general program chairman is Marjorie Dunn Campbell, head of art department, Mansfield Senior High School, Mansfield, Ohio.

The coheadquarters hotels are the Muehlebach and Phillips, and the convention meetings will be held in the new municipal auditorium.

♦ The Pennsylvania All-State Industrial-Arts Conference will be held this year at State Teachers College, California, Pa., on April 24 and 25, 1942.

♦ The second New York State Newspaper Mechanical Research Conference will be held at the Rochester Athenaeum and Mechanics Institute, Rochester, N. Y., February 23 and 24, 1942.

Byron G. Culver, supervisor of the Department of Publishing and Printing at the Rochester school, is the general chairman of the conference. The members of the teaching staff, Frank DeWitt, Donald L. Ritchie, and Joseph F. Sorace — all members of our association — will assist Mr. Culver.

Composing room, pressroom, stereotype room, engraving room, and photography department problems will be considered during the two-day program. Each session will consist of open discussions under the chairmanship of prominent mechanical executives of New York State newspapers. A board of nationally known experts will be on the platform at each meeting to answer questions.

♦ Quite a number of the industrial instructors, who attended the South Eastern Minnesota Education Association conference at Rochester this fall, came with a rather vague notion that what we needed in this section of Minnesota was an active, aggressive organization for men in our line of work.

Getting together and talking things over revealed sufficient reasons why such an organization would be of benefit to us and, through us, to the schools and to the people of our communities.

Some teachers felt that we should have an organization for our own protection and personal advancement, as teachers. Some of us needed a place where we could bring our shop problems for solution. All of us wanted to know what the other fellow was doing in his shop. We wanted regular meetings to discuss problems and current trends in all fields of industrial arts.

The present war is changing our curricular needs, more noticeably now from day to day. What field is worth while now? Will it be worth while a year from now? New processes are coming up. Are they pan flashes or do they foretell the opening of a new industrial branch?

Judging by the earnest demands and cross demands for information, and the sincere and hearty evidences of cooperation, promise is given of a vigorous, worthy, and long-lived organization.

*— Chas. V. Palmer*

## New Publications

**Strength of Materials**

By John W. Breneman. Cloth, 145 pages, 6¼ by 9¼ in., illustrated. Price, $1.50. Published by McGraw-Hill Book Co., New York, N. Y.

Written on the level of the advanced high school student, the book presents the subject in understandable and interesting manner.

The book is one of the *Industrial Series* put out by these publishers and covers simple stresses, shear, riveted joints, stresses in cylinders, torsion, beams, deflections, combined axial and bending stresses, eccentric loads and columns.

There is also a chapter on materials, and an appendix of useful reference tables.

(Continued on page 35A)

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200 William St., New York

(Continued from page 30A)

**Wood Patternmaking**
By Herbert J. McCaslin. Cloth, 339 pages, 5 by 7½ in., illustrated. Price, $2.25. Published by McGraw-Hill Book Co., New York, N. Y.

This is the third edition of this book on the elements of wood patternmaking.

The material is presented in the form of bench jobs, and the making of more than 50 individual patterns.

A glossary of patternmaking and molding terms is appended.

Then there are merchant ships, pirate ships, schooners, brigs, and barks of various kinds. Simple and clear directions accompany the illustrations.

**Principles and Practice of Radio Servicing**
By H. J. Hicks, M.S. Cloth, 305 pages, 6¼ by 9¼ in., illustrated. Price, $3. Published by McGraw-Hill Book Co., New York, N. Y.

The book has been written for the radio serviceman. Mathematical discussions have been reduced to a bare minimum, and the practical application of the theory to servicing procedures has been stressed.

The business side of radio servicing has also been introduced. The reference tables in the appendix have been collected to help the busy serviceman.

## MISCELLANEOUS BOOKS AND PAMPHLETS

Among the books and pamphlets received which may be of interest to shop teachers are the following:

**Occupational Information and Guidance Service 1941–42**
Distributed by the Federal Security Agency, U. S. Office of Education, Vocational Division, Washington, D. C.

**Training for Recreation Under the W.P.A.**
By Dorothy I. Cline. An account of the in-service training program of the division of recreation, published by the University of Chicago Press, Chicago, Ill. Price, 60 cents.

**Distributive Education — Organization and Administration**
Prepared by Kenneth B. Haas. For sale by the Superintendent of Documents, Washington, D. C. Price, 10 cents.

**The Dictionette**
By Hardin Lucas. Published by the Codetutor Co., Times Square, New York, N. Y.

**Jobs in the Forests of the Pacific Northwest**
By Donald Nylen and John Rule. Published by Northwest Regional Council, Portland, Ore. Price, 50 cents.

**Military Training and Jobs**
By Lyle M. Spencer, Director, and Robert K. Burns, Director of Research, Science Research Associates. Published by Science Research Associates, 1700 Prairie Ave., Chicago, Ill.

**Labor Requirements for Defense**
Compiled by F. Theodore Struck, Consultant in Vocational Education, U. S. Office of Education, and distributed by the Federal Security Agency, U. S. Office of Education, Washington, D. C.

**Digest of Annual Reports of State Boards for Vocational Education to the U. S. Office of Education**
This digest includes recent opinions and rulings relating to the program of vocational education carried on under federal grants. The book is issued by the Federal Security Agency, U. S. Office of Education, Vocational Division, Washington, D. C.

**The New Army of the United States**
The War Department, Washington, D. C.

**Fine and Applied Arts**
By Royal Bailey Farnum, art director and executive vice-president, Rhode Island School of Design, Providence, R. I. Published by the Bellman Publishing Co., Inc., 6 Park St., Boston, Mass.

**Shipbuilding and Marine Engines**
By W. Philip Leidy. A selected list of books and pamphlets, published by American Library Association, Chicago, Ill.

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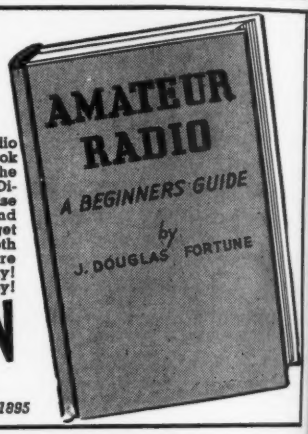


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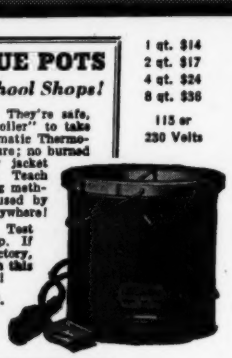

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